City of Silverton

Addendum to the Marion County Natural Hazards Mitigation Plan

Report for

City of Silverton
306 S. Water Street
Silverton, OR 97002

Prepared by:

Oregon Partnership for Disaster Resilience
1209 University of Oregon
Eugene, OR 97403-1209

January, 2010

PARTNERSHIP FOR DISASTER RESILIENCE
WWW.OREGONSHOWCASE.ORG

U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

January 8, 2010

Honorable Sam Brentano
Honorable Janet Carlson
Honorable Patricia Milne
Marion County Board of Commissioners
P.O. Box 14500
Salem, Oregon 97309

Dear Commissioners Brentano, Carlson, and Milne:

On January 27, 2006, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) approved the *Marion County Natural Hazard Mitigation Plan* as a multi-jurisdictional local plan as outlined in 44 CFR Part 201. With approval of this plan, the following entities are now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through January 27, 2011:

Marion County **City of Aurora** **City of Keizer**

City of Silverton

The list of approved jurisdictions has been updated to include the City of Silverton, which has recently adopted the City of Silverton Addendum to the Marion County Natural Hazard Mitigation Plan. To continue eligibility the plan must be reviewed, revised as appropriate, and resubmitted within five years of the original approval date.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact our State counterpart, Oregon Emergency Management, which coordinates and administers these efforts for local entities.

Sincerely,

Mark Carey, Director
Mitigation Division

cc: Dennis Sigrist, Oregon Emergency Management

KM:bb

CITY OF SILVERTON
RESOLUTION NO. 10-01

A RESOLUTION ADOPTING THE CITY OF SILVERTON'S REPRESENTATION IN THE MARION COUNTY MULTI-JURISDICTION HAZARD MITIGATION PLAN

WHEREAS, the City of Silverton is vulnerable to the human and economic costs of natural, technological and societal disasters, and

WHEREAS, the City Council of the City of Silverton recognizes the importance of reducing or eliminating those vulnerabilities for the overall good and welfare of the community, and

WHEREAS, the City of Silverton has participated in the development of the Marion County Multi-Jurisdiction Natural Hazard Mitigation Plan, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities, and

WHEREAS, the City of Silverton's representatives and staff have identified natural hazard risks and prioritized a number of proposed actions and programs needed to mitigate the vulnerabilities of the City of Silverton to the impacts of future disasters, and

WHEREAS, these proposed projects and programs have been incorporated into the Marion County Multi-Jurisdiction Natural Hazard Mitigation Plan that has been prepared and promulgated for consideration and implementation by the cities of Marion County; NOW THEREFORE

THE COMMON COUNCIL OF THE CITY OF SILVERTON RESOLVES AS FOLLOWS:

Section 1. The Common Council of the City of Silverton hereby accepts and approves of its section of the Marion County Multi-Jurisdiction Hazard Mitigation Plan as a reasonable process to identify and plan for potential hazards in the City of Silverton and Marion County,

Section 2. The agency personnel of the City of Silverton are requested and instructed to pursue available funding opportunities for implementation of the actions and proposals designated therein,

Section 3. The City of Silverton will, upon receipt of such funding or other necessary resources, seek to implement the mitigation proposals identified by the Jurisdiction's Hazard Mitigation Planning Committee, and

Section 4. The City of Silverton will continue to participate in the updating and expansion of the Marion County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead, and

Section 5. The City of Silverton will further seek to encourage the businesses, industries and community groups operating within and/or for the benefit of the City of Silverton to also participate in the updating and expansion of the Marion County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead.

ADOPTED BY the City Council of the City of Silverton, Marion County, Oregon this 4th day of January, 2010.

Mayor

ATTEST:

City Manager/Recorder

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Section 1: Planning Process

Overview

Silverton developed this addendum to the Marion County multi-jurisdictional Natural Hazards Mitigation Plan in an effort to increase the community's resilience to natural hazards. The addendum focuses on the natural hazards that could affect the city of Silverton, Oregon, which include drought, flood, earthquake, landslide, volcano, wildfire, wind storm, and severe winter storm. It is impossible to predict exactly when disasters may occur, or the extent to which they will affect the city. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

The addendum provides a set of actions that aim to reduce the risks posed by natural hazards through education and outreach programs, the development of partnerships, and the implementation of preventative activities through the city's development code, wastewater system facility plan, emergency operations plan, etc. The actions described in the addendum are intended to be implemented through existing plans and programs within the city.

How was the Addendum Developed?

In the fall of 2006, the Oregon Partnership for Disaster Resilience (the Partnership / OPDR) at the University of Oregon's Community Service Center partnered with Oregon Emergency Management (OEM) to develop a Pre-Disaster Mitigation Planning Grant proposal to create natural hazards mitigation plan addenda for Oregon's Mid/Southern Willamette Valley cities. FEMA awarded the region with a Pre-Disaster Mitigation planning grant, and planning efforts with the cities of Aurora, Keizer, Silverton, and Woodburn began in the winter of 2009. The Partnership facilitated and documented each of the cities' planning processes.

The following representatives served as steering committee members for the city of Silverton's natural hazard mitigation planning process.

- Rick Lewis, Silverton Police Department
- Bryan Cosgrove, Silverton City Manager
- Rich Barstad, Silverton Public Works
- Darrel Mathews, Silverton Local Business
- Doreen Kelly, Silverton Together (Community Nonprofit)
- Ed Grambusch, Silverton Fire Department
- Steve Kay, Silverton Community Development Department
- Genie Stoll, Silverton Business Owner

Backups:

- Denny Stoll, Silverton City Council
- Stacy Palmer, Silverton Chamber of Commerce
- Patrick Lesire, Silverton Merchant's Group

The planning process and associated resources used to create Silverton's Addendum to the Marion County Natural Hazards Mitigation Plan were developed by the Partnership. To coordinate planning efforts, the steering committees from Aurora, Keizer, Silverton, and Woodburn participated in joint meetings facilitated by the Partnership. The planning process was designed to: (1) result in an addendum that is Disaster Mitigation Act 2000 compliant; (2) coordinate with the state's plan and activities of the Partnership; and (3) build a network of local organizations that can play an active role in plan implementation. The following is a summary of major activities included in the planning process including public outreach activities.

Plan Work Sessions

Project Kickoff (February-March 2009)

On February 25, 2009, the Partnership hosted a kickoff meeting in Salem with representatives from the cities of Aurora, Keizer, Silverton, and Woodburn. The purpose of the meeting was: 1) to provide an overview of the Pre-Disaster Mitigation Program and the Oregon Partnership for Disaster Resilience; 2) to describe the four-phase mitigation planning process and schedule of meeting dates to occur; and 3) to provide instruction and guidance in developing community steering committees. One or two representatives from each city (i.e., "city leads") attended. Following the meeting, city leads were asked to develop full steering committees, and to review and edit the community profile section of their city addendums.

Risk Assessment (April-May 2009)

On April 15, 2009, the Partnership facilitated a risk assessment training / work session with the cities of Aurora, Keizer, Silverton, and Woodburn. The work session was developed and implemented by the Partnership, with assistance from Oregon Emergency Management, the United States Geological Survey, the Federal Emergency Management Agency (FEMA Region X), and City-County Insurance. Full steering committees from each city were present. The purpose of the work session was to: (1) explain the process and components of a risk assessment; (2) identify and discuss previous natural hazard events within each community; and (3) identify the cities' risks and vulnerabilities to natural hazards.

The Partnership facilitated and documented discussions within each community's steering committee, and subsequently developed Section 3 below for the city of Silverton. Work session materials and sign-in sheets for the April 15th meeting are located in Appendix A, Planning and Public Process.

Action Item Development (June 2009)
On June 10th, 2009, the Partnership facilitated an action item development training / work session with the cities of Aurora, Keizer, Silverton, and Woodburn. The work session was developed and implemented by the Partnership, and full steering committees from each city were present. The purpose of the work session was to: 1) identify missions and goals for each city's addendum; and 2) select and develop mitigation action items. The Partnership facilitated and documented discussions within each community's steering committee, and subsequently developed Section 4 below for the city of Silverton. Work session materials and sign-in sheets for the June 10th meeting are located in Appendix A, Planning and Public Process.

Plan Implementation and Maintenance (July-August 2009)
On July 29th, 2009, the Partnership facilitated a plan implementation and maintenance training / work session with the cities of Aurora, Keizer, Silverton, and Woodburn. The work session was developed and implemented by the Partnership, with assistance from Oregon Emergency Management. With guidance and facilitative assistance from the Partnership, each steering committee identified plan 'conveners' and 'coordinating bodies.' Additionally, each committee established plan maintenance schedules, and strategies for continuing public involvement throughout the five-year plan implementation and maintenance cycle. Finally, the Partnership asked each community to identify opportunities or strategies for: 1) implementing mitigation actions via existing plans and policies; and 2) incorporating mitigation-related activities and responsibilities into city employees' work plans or job descriptions. Please see Section 5 below for information regarding Silverton's plan implementation and maintenance strategies.

Aside from community discussions, the Partnership presented information related to grant opportunities and founding resources. Additionally, Oregon Emergency Management provided a general overview of the benefit-cost analysis process that's required when developing applications for federal mitigation grant programs.

Public Involvement

Stakeholder Survey
As part of a regional public involvement effort, the Partnership developed and distributed an online survey to a select group of stakeholders in each community. Representatives from the following organizations were identified by Silverton's steering committee members, and contacted via email to participate:

- Silverton School District (2 representatives)
- Northwest Natural Gas
- Department of Geology and Mineral Industries
- Portland General Electric
- Allied Waste

- Silverton Chamber of Commerce
- Silverton Historical Society
- Silverton Watershed Council
- Silverton Together
- Large Businesses (3 Representatives)
- Local Realtors (2 Representatives)
- Silverton Grange
- Silverton Mayor
- Lions Club
- Oregon Garden
- Silverton Hospital
- Financial Group (Local Bank)
- National Guard

Results from the online survey were used to inform the city's risk assessment and mitigation actions. Please see Appendix A, Planning and Public Process for a complete list of organizations that were invited to participate, in addition to survey results.

Plan Review

The city's steering committee served as the primary plan reviewers. Upon completion of a final draft addendum, the city informed residents about the plan, and requested feedback using the following methods:

- The city posted a short description of the mitigation plan in the Statesman Journal on September 30, 2009. The article directed readers to view the plan via a link on the city's website. Marion County's project webpage located on *The Partnership* website (www.OregonShowcase.org) hosted the draft plan. Please see Appendix A for a copy of the journal article.

- The city posted the following notice on the city's website between September 3 and September 15, 2009. No comments were received.

  > ***Natural Hazards Mitigation Plan Ready for Review***
  > *The city of Silverton is making available a draft copy of its All Hazards Mitigation Plan, which can be viewed by visiting the following website:*
  > *www.oregonshowcase.org/projects/willamettecities*
  >
  > *Please direct all comments regarding the plan to Silverton City Manager, Bryan Cosgrove, at bcosgrove@silverton.or.us, or 503-874-2205. Comments must be received by September 17, 2009.*

- The steering committee sent an email to the Emergency Management Advisory Committee (EMAC) on October 12th. The EMAC was asked to review and comment on the plan by October 28th. Comments were integrated into the plan, where applicable.

Additionally, five of the stakeholders that participated in the survey also volunteered to review plan drafts. The steering committee contacted those

persons during the final review process. Marion County's project webpage located on *The Partnership* website (www.OregonShowcase.org) hosted plan drafts, and all comments were directed to the city manager. The final adopted and approved addendum will be posted on the University of Oregon Libraries' Scholar's Bank Digital Archive.

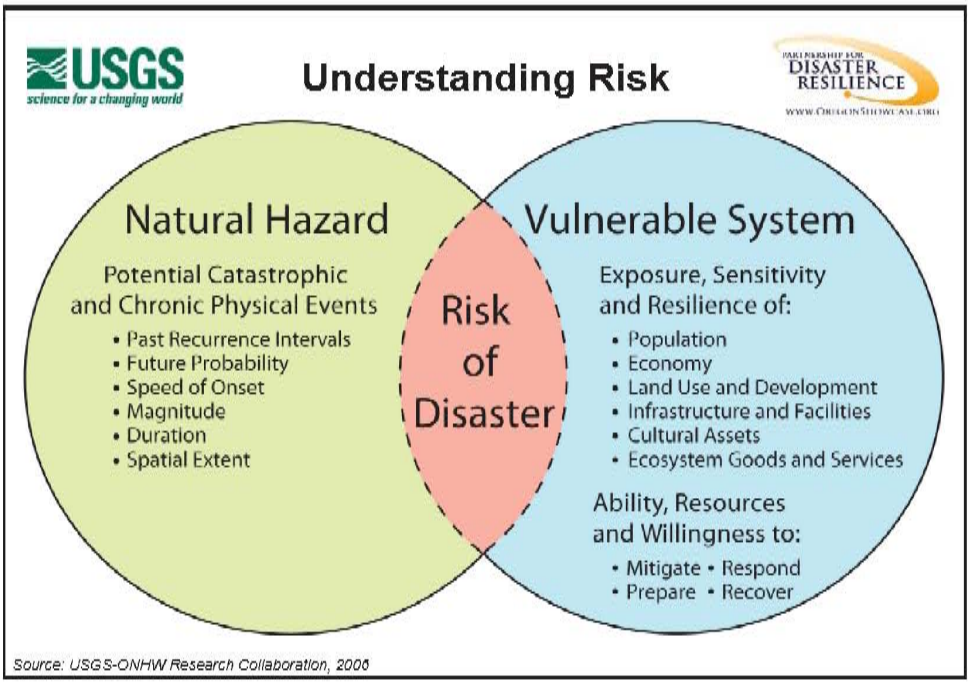
Adoption

The city of Silverton adopted the Marion County Natural Hazard Mitigation Plan via resolution on January 4, 2010.

Section 2: Community Profile

The following section describes the city of Silverton from a number of perspectives in order to help define and understand the city's sensitivity and resilience to natural hazards. Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). Community resilience factors can be defined as the community's ability to manage risk and adapt to hazard event impacts (e.g., governmental structure, agency missions and directives, and plans, policies, and programs). The information in this section represents a snapshot in time of the current sensitivity and resilience factors in the city when the plan was developed. The information documented below, along with the risk assessments in Section 3 below, should be used as the local level rationale for the risk reduction actions identified at the end of this addendum in Appendix D. The identification of actions that reduce the city's sensitivity and increase its resilience assist in reducing overall risk, or the area of overlap in Figure 1 below.

Figure 1 Understanding Risk[i]

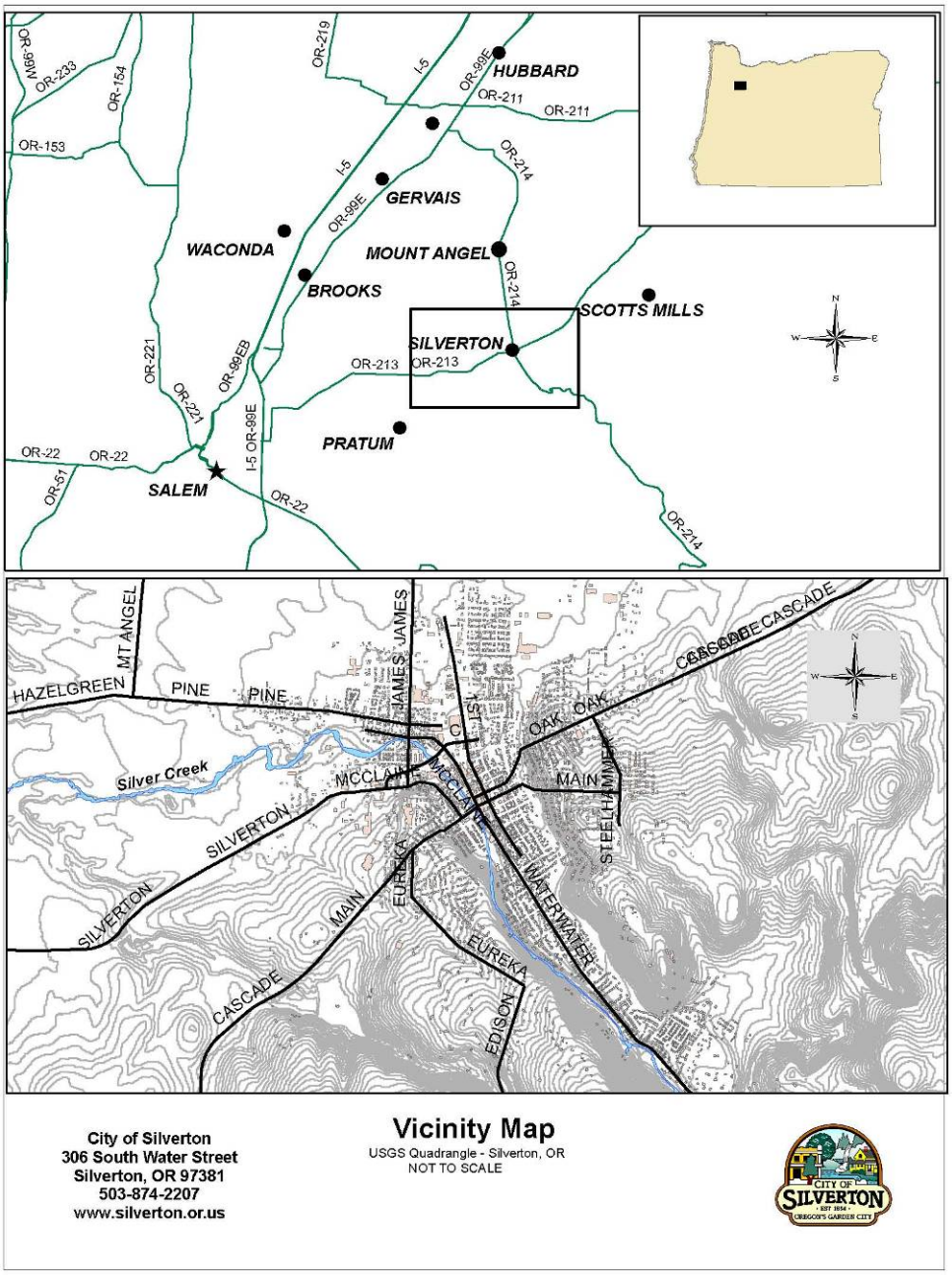


Geography & Climate

Silverton is located in the Willamette Valley in Marion County, Oregon, approximately 14 miles east of the city of Salem, near the Cascade foothills. Silverton experiences a moderate climate. In August, the average high

temperature is 79.2 degrees and the average low temperature is 54.3 degrees. Wintertime temperatures in January range from an average high of 45.9 to an average low of 33.7.[ii] The city receives an average annual precipitation of 46.91 inches.[iii] Silver Creek runs through the city. The creek is dammed to form Silver Creek Reservoir which lies southeast of the city's limits. While the majority of Silverton is located on flat terrain, several large hills within residential and commercial neighborhoods enclose the downtown area. The landscape surrounding the city consists of hilly farm and forestland.

Figure 2 Silverton Vicinity



Population & Demographics

The city of Silverton has grown significantly over the past 20 years as shown in Table 1 below. From 1990 to 2000, the city grew by 33%, and has continued to grow over the past eight years to 9,540 residents.

Table 1. Silverton Population Change, 1990-2008.

Year	Population	% Change
1990	5,635	-
2000	7,470	33%
2008	9,540	28%

Source: Portland State University, Population Research Center[iv]

Disaster impacts (in terms of loss and the ability to recover) vary among population groups following a disaster. Historically, 80% of the disaster burden falls on the public. Of this number, a disproportionate burden is placed upon special needs groups, particularly children, the elderly, the disabled, minorities, and low income persons. Portions of Silverton's population fall into these special needs groups. Almost 2.6% of the city's population, or 178 people, speak English less than very well.[v] Table 2 also shows that 13% of all working individuals in 2000 were living below the federal poverty level. In addition, Table 3 shows that 13.4% of the city's residents are 65 years of age or older. Elderly individuals may require special consideration due to their sensitivities to heat and cold, their reliance upon public transportation for medications, and their comparative difficulty in making home modifications that reduce risk to hazards.

Table 2. City of Silverton Poverty Status, 2000

Type	# of People	% of Population
Families	200	10.4
Individuals	963	13

Source: US Census Bureau, 2000.[vi]

Table 3. City of Silverton Population by Age, 2000

Age Range	Total Persons	% of Population
Under 5 Years	616	8.3%
5-19 Years	1,956	26.4%
20-44 Years	2,348	31.7%
45-64 Years	1,502	20.3%
65+ Years	992	13.4%
Total	**7,414**	**100%**

Source: US Census Bureau, 2000.[vii]

Employment & Economics

Historically, Silverton's economy relied on agriculture, forestry, and the manufacturing of agricultural and forestry products. Today, Silverton's economy is centered on educational, health and social services as well as manufacturing, retail, and recreational/accommodation services (see Table

4 below). Tourism also plays a big part in Silverton's economy as tourists come to see the city's historic downtown, nearby Silver Creek Falls State Park, and the Oregon Garden. Finally, Silverton also serves as a bedroom community to Salem, where many of the residents commute for work.

Table 4. City of Silverton Employment by Major Industry, 2000.

Industry	Total Persons Employed	% of Population
Educational, health and social services	765	23.5%
Manufacturing	432	13.3%
Retail trade	324	9.9%
Arts, entertainment, recreation, accommodation and food services	289	8.9%
Finance, insurance, real estate, and rental and leasing	280	8.6%
Construction	262	8.0%
Public administration	240	7.4%
Professional, scientific, management, administrative, and waste management services	180	5.5%
Other services (except public administration)	139	4.3%
Transportation and warehousing, and utilities	108	3.3%
Wholesale trade	102	3.1%
Information	79	2.4%
Agriculture, forestry, fishing and hunting, and mining	60	1.8%
Civilian employed population 16 years and over	**3260**	**100%**

Source: US Census, 2000.[viii]

Median income can be used as an indicator of the strength of the community's stability. In 1999, the median household income in Silverton was $38,429, nearly $3,565 less than the national median household income, and $1,885 less than Marion County's 1999 median household income.[ix] Low-income residents may be more vulnerable to the impacts of natural hazard events, and may limit the community's ability to quickly recover after a natural disaster. As noted in Table 2, 10.4 % of families are considered to be below poverty status.

Housing

Housing type and age are important factors in mitigation planning. Certain housing types tend to be less disaster resistant and warrant special attention: mobile homes, for example, are generally more prone to wind and water damage than standard stick-built homes. Generally the older the home is, the greater the risk of damage from natural disasters. This is because stricter building codes have been developed following improved scientific understanding of plate tectonics and earthquake risk. For example, structures built after the late 1960s in the Northwest and California use earthquake resistant designs and construction techniques. In addition, FEMA began assisting communities with floodplain mapping during the 1970s, and communities developed ordinances that required

homes in the floodplain to be elevated to one foot above Base Flood Elevation.

In 2000, Silverton had 2,903 housing units. Of those, 93.2% were occupied (2,707) and 5.4% were vacant (158).[x] Of the occupied housing units, 56.6% (1,644) units were owner-occupied and 36.6% (1,063) units were renter-occupied.[xi] Studies have shown that renters are less likely than homeowners to prepare for catastrophic events.[xii] Renters tend to have higher turnover rates that may limit their exposure to hazard information. Likewise, preparedness campaigns tend to pay less attention to renters. Renters typically have lower incomes and fewer resources to prepare for natural disasters, and renters may lack the motivation to invest in mitigation measures for rented property.[xiii]

Silverton also has a large number of older housing structures that may be vulnerable to earthquakes. Approximately 67% of the housing units were built before 1980 when more stringent seismic codes were put into place (see Table 5 below).

Table 5. City of Silverton Housing Structure Age, 2000

Year Built	Total Structures	% of Structures
Built 1999 to March 2000	109	3.8%
Built 1995 to 1998	273	9.4%
Built 1990 to 1994	284	9.8%
Built 1980 to 1989	298	10.3%
Built 1970 to 1979	430	14.8%
Built 1960 to 1969	315	10.9%
Built 1940 to 1959	363	12.5%
Built 1939 or earlier	831	28.6%
Total Housing Units	**2,903**	**100%**

Source: US Census, 2000.[xiv]

Table 6. City of Silverton Housing Type, 2000

Housing Type	Total Structures	% of Structures
Single-Family Unit	2,062	71.0%
Multi-Family 2 units	163	5.6%
Multi-Family 3 or 4 units	207	7.1%
Multi-Family 5 to 20 units	234	8.1%
Mobile home	237	8.2%
Boat, RV, van, etc.	0	0.0%
Total Housing Units	**2,903**	100%

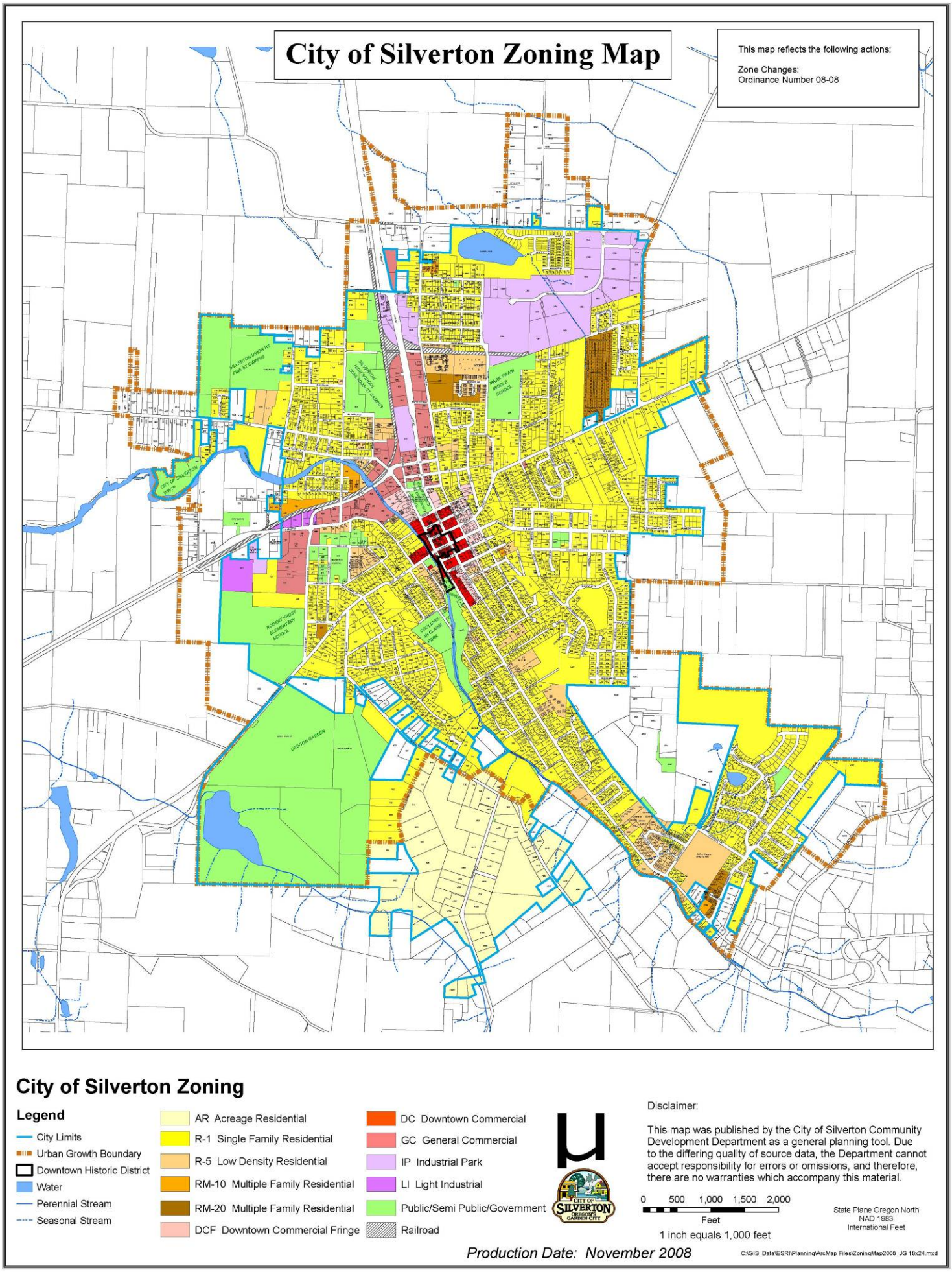
Source: US Census, 2000.[xv]

Land Use & Development

As of 2009, the city of Silverton contains 2,664 acres of land within the Urban Growth Boundary (UGB). Approximately 2,013 acres of land are within the city limits and 651 acres of land are between the city limits and the UGB.[xvi] Silverton also contains 201 acres within the city limits that are outside of the UGB. Finally, approximately 270 acres of available vacant land exists within the UGB.[xvii] Within the city limits, land is zoned Low Density to High Density Residential, Commercial, Industrial, and Public. See Figure 3 below, Silverton's Zoning Map.

Future growth is anticipated on vacant land in the UGB west and east of the city along highway 213, west of the city along Pine Street, and north of the city near highway 214 and Hobart Road. Some of the lands are constrained by floodplain and steep slopes. However, the Comprehensive Plan identifies these areas and states that "the city will prevent development in the areas of natural hazard unless special design features adequately ensure the safety and protection of life and property." In addition, applicants who want to develop in areas with natural hazards are required to provide site specific information determining the hazard present.[xviii]

Figure 3 City of Silverton Zoning Map



Transportation

While Silverton is somewhat distant from other communities, it is easily accessible by a number of highway connections that run through or near the city. Highway 213 is the main east-west highway that connects Silverton with Salem to the west, and Oregon City to the northeast. Highway 214 is the major north-south highway that connects Silverton with Mt Angel and Woodburn to the north and Silver Creek Falls State Park and Highway 22 to the south. Highways 213 and 214 intersect in Silverton's commercial downtown.

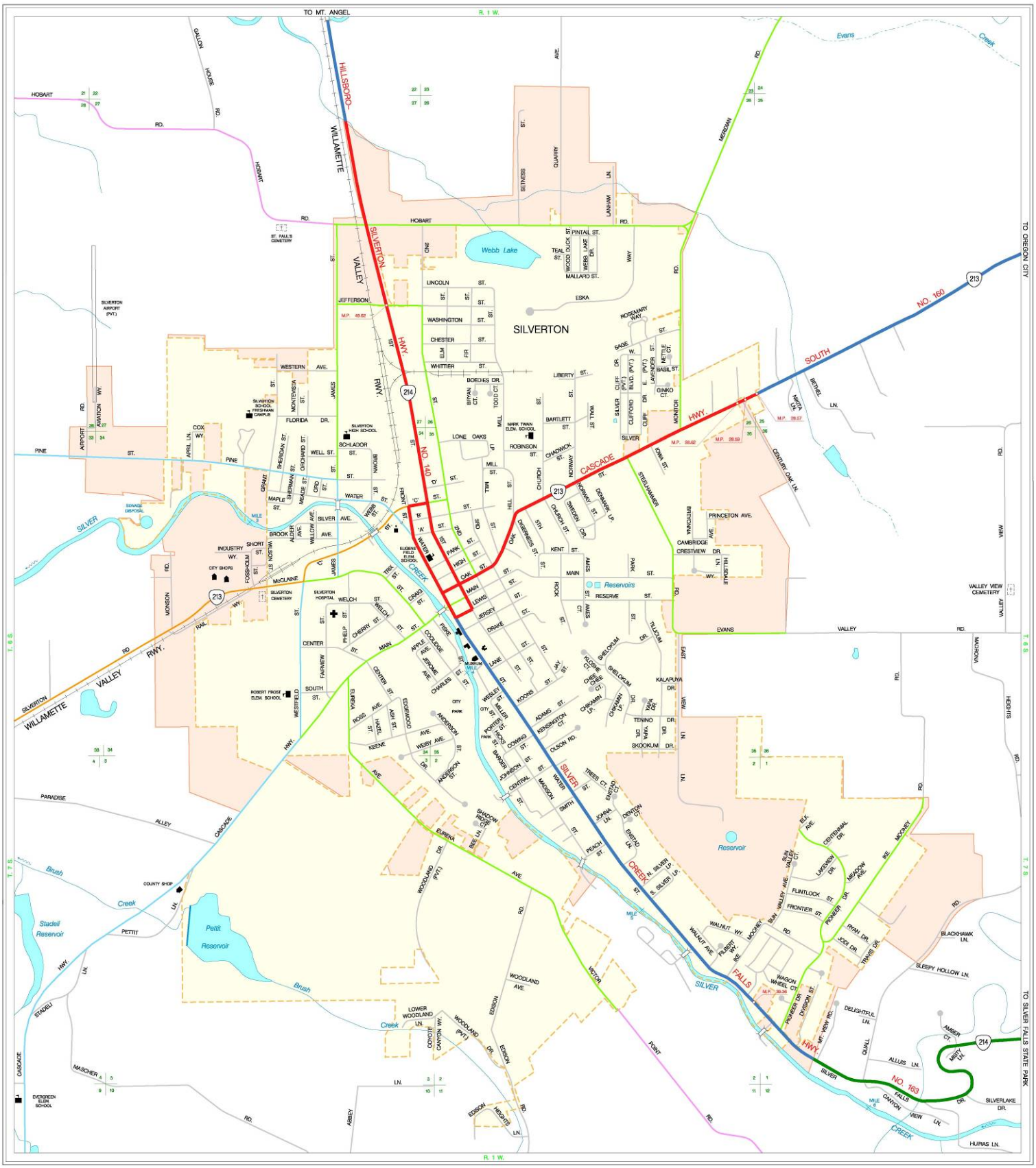
Transportation is also an important consideration when planning for emergency service provisions. Growth within the city will put pressure on both major and minor roads, especially if the main mode of travel is by single occupancy vehicles. How people travel to work is indicative of the prevalence of single occupancy vehicle travel, and can help predict the amount of traffic congestion and the potential for accidents. Table 7 below represents the different methods Silverton residents use to travel to work. Figure 4 below shows the major transportation networks that run through Silverton.

Table 7. Transportation Mode Used to Commute to Work, Silverton, 2000.

Method of Commuting	Number of Residents	% of Residents
Car, truck, or van -- drove alone	2,398	73.9%
Car, truck, or van -- carpooled	560	17.3%
Walked	130	4.0%
Worked at home	78	2.4%
Other means	62	1.9%
Public transportation (including taxicab)	15	0.5%
Mean travel time to work (minutes)	**23.3**	**-**

Source: US Census 2000.[xix]

Figure 4 City of Silverton Transportation Map



LEGEND

FUNCTIONAL CLASSIFICATION (STATE OTHER)
FOR FURTHER FUNCTIONAL CLASSIFICATION INFORMATION, CONTACT O.D.O.T. REGION OFFICE.

- INTERSTATE
- PRINCIPAL ARTERIAL
- MINOR ARTERIAL
- URBAN COLLECTOR / RURAL MAJOR COLLECTOR
- MINOR COLLECTOR
- LOCAL ROAD
- OTH. ROUTE – US. ROUTE – INTERSTATE ROUTE
- NATIONAL HIGHWAY SYSTEM ROUTE
- URBAN GROWTH BOUNDARY
- CITY LIMIT
- AMTRAK RAIL PASSENGER STATION
- BRIDGE
- GRADE SEPARATIONS : STATE – OTHER FUNCTIONALLY CLASSED – LOCAL ROAD

- PUBLIC BUILDING
- COURTHOUSE
- CITY HALL
- ARMORY
- POST OFFICE
- SCHOOL
- LIBRARY
- SAFETY REST AREA
- WEIGH STATION
- PARK & RIDE LOCATION
- INTERCITY – CITY TRANSIT
- COMMERCIAL – GENERAL AVIATION
- AMTRAK STOP – PORT FACILITY
- GRAVEL PIT – QUARRY – ODOT STOCKPILE SITE

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SCALE
500 0 500 1000 FEET
150 0 150 300 METERS

PREPARED DIGITALLY BY THE OREGON DEPARTMENT OF TRANSPORTATION IN COOPERATION WITH THE U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

SILVERTON
Population 9,205 *

T. 6-7 S. R. 1 W. W.M.

PRELIMINARY COPY SUBJECT TO CORRECTION

OREGON TRANSPORTATION MAP

Showing Functional Classification of Roads
City of

SILVERTON

MARION COUNTY
2007

PARK & RIDE · INTERCITY · AMTRAK — AVAILABLE TRANSPORTATION SERVICES SHOWN WITH YELLOW BACKGROUND

PORT · AIRPORT · COMM. AIR — AVAILABLE TRANSPORTATION SERVICES SHOWN WITH YELLOW BACKGROUND

Copies available from the Oregon Department of Transportation, Map Distribution Unit, Mill Creek Office Park, 555 13th St. NE, Suite 2, Salem, Oregon 97301-4178, Telephone (503) 986-3154, http://egov.oregon.gov/ODOT/TD/TDATA/gis/CityMaps.shtml
* Based on current Oregon Population Report, College of Urban and Public Affairs, Portland State University, http://pdx.edu/prc

SILVERTON - MARION COUNTY

Critical Facilities & Infrastructure

Critical facilities are those that support government and first responders' ability to take action in an emergency. They are a top priority in any comprehensive hazard mitigation plan. Individual communities should inventory their critical facilities to include locally designated shelters and other essential assets, such as fire stations, public works shops, and water and waste water treatment facilities.

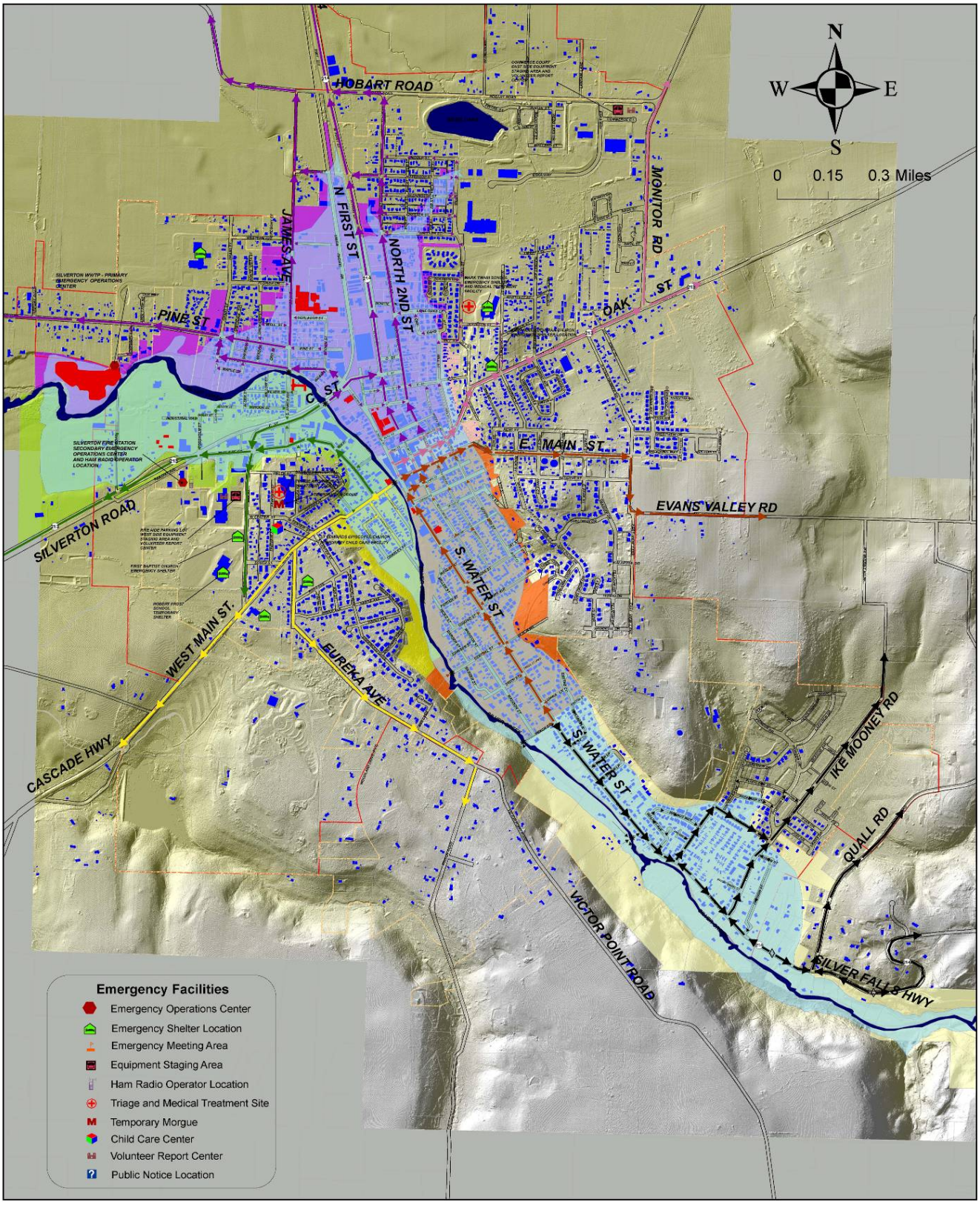
Silverton contains a number of critical facilities that provide necessary services to city residents. Silverton's City Hall contains the office space for the Administrative, Finance, Public Works, Police, and Community Development Departments. Adjacent to the City Hall is the Silver Falls Library. The Silverton Rural Fire District contains five fire stations, Fire Station # 1 in Silverton and four others in outlying rural areas. The 48 bed Silverton Hospital provides medical services in Silverton and surrounding communities, serving a population of approximately 30,000.

The Silver Falls School District contains five public schools in the city; one private school is also located in Silverton. There are 1,200 students in the high school and 3,573 students in the district, a majority of who attend school inside the city. Of the 3,573 students, 8.45% are in the English as a Second Language (ESL) program.

Silverton also contains a number of critical infrastructure facilities. Two adjacent water treatment plants supply three treated water storage tanks totaling 4.5 million gallons. Two booster pump stations supply water to distribution areas higher than the treatment plant. Silverton's water comes from two sources which include Abiqua Creek and Silver Creek. Silverton also has a reservoir contained by the Silver Creek Dam southeast of the city. The city's sewer and wastewater treatment facility dates back to 1910 and was last updated in 1998. The city has a wastewater facility master plan completed in 2007 that provides recommendations for further wastewater improvements.

Figure 5 below shows the location of Silverton's 'emergency facilities' (i.e., emergency operations center, emergency shelter locations, emergency meeting areas, equipment staging areas, etc) in addition to emergency evacuation routes.

Figure 5 City of Silverton Emergency Facilities and Evacuation Route Map (Silver Creek Dam Breach)



Related Physical Features and Municipal Boundaries

- Area of Inundation
- Critical Facilities Inside Inundation Area
- Building Structures
- Critical Bridge Locations
- Silverton City Limits
- Urban Growth Boundary

Inundation Emergency Zones

Zone Number	Number of Affected Structures
Zone 1	649
Zone 2	294
Zone 3	96
Zone 4	668
Zone 5	56
Zone 6	472
	2235 - Total

Inundation Emergency Zone Evacuation Routes

- Zone 1 Primary Evacuation Routes
- Zone 1 Secondary Evacuation Routes
- Zone 2 Primary Evacuation Routes
- Zone 2 Secondary Evacuation Routes
- Zone 3 Primary Evacuation Routes
- Zone 3 Secondary Evacuation Routes
- Zone 4 Primary Evacuation Routes
- Zone 4 Secondary Evacuation Routes
- Zone 5 Primary Evacuation Routes
- Zone 5 Secondary Evacuation Routes
- Zone 6 Evacuation Routes Primary
- Zone 6 Secondary Evacuation Routes
- Breaks in Direction

CITY OF SILVERTON OREGON'S GARDEN CITY

Historic & Cultural Resources

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources of tourism dollars. Because of their role in defining and supporting the community, protecting these resources from the impact of disasters is important.

Buildings and sites listed on the National Register of Historic Places contain special significance for national, state, or local history. It is the country's official list of historic buildings and sites worthy of preservation. One building in Silverton is listed on the National Register of Historic Places—the Calvary Lutheran Church and Parsonage listed in 1985. Silverton also has a downtown historic district called the Silverton Commercial Historic District, which was listed on the National Register of Historic Places in 1987.

Other historic and cultural resources include the Silverton Country Museum run by the Silverton Historical Society; the murals depicting historic events found throughout the city; Silver Creek Falls State Park located nearby; and the Oregon Garden which displays thousands of plants and contains the Gordon House, the only house designed by Frank Lloyd Wright in Oregon.

Government Structure

The city of Silverton operates under a Council-Manager form of government. The City Council consists of a mayor and six councilors. They are advised by the Planning Commission, Historic Landmarks Commission, Urban Renewal Agency and Budget Committee. The City Manager is the administrative head of city government and is appointed by City Council.

The Silverton City Hall contains the offices for the following city departments: Administration; Finance; Community Development which includes Planning, Building, and Code Enforcement division; Public Works; and Police. The Community Development Department plays an important role in natural hazard mitigation through implementation of the zoning ordinance. In addition, the Building Division is responsible for the implementation of local building codes to ensure that buildings are constructed to standards set forth by the Oregon Building Codes Division.

Existing Plans & Policies

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances, and technical reports or studies. Plans and policies already in existence have support from local residents, businesses and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. [xx]

The city of Silverton's Natural Hazards Mitigation Plan Addendum includes a range of recommended action items that, when implemented, will reduce Silverton's vulnerability to natural hazards. Many of these recommendations are consistent with the goals and objectives of the city's existing plans and policies. Linking existing plans and policies to the Natural Hazards Mitigation Plan helps identify what resources already exist that can be used to implement the action items identified in the plan. Implementing the plan's action items through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the city's resources. Table 8 documents the plans and policies already in place in Silverton.

Table 8. Silverton Existing Plans

Name	Date of Last Revision	Author/Owner	Description	Relation to Natural Hazard Mitigation
Silverton Comprehensive Plan	Revised 2002	City of Silverton	Establishes the city's authority to plan for and deal with issues related to the future development of Silverton.	• Explains the flood, steep slope, landslide hazards found in Silverton • Provides policy guidelines for future development and land use in the city. • Policies and implementation actions addressing natural hazards and Goal 7 in the Comprehensive Plan can be linked with natural hazard action items.
Silverton Development Code	Revised November 2008	City of Silverton	Provides regulations for development in the city of Silverton.	• Contains guidance for development in the flood hazard zone (FH), and steep slope hazard zone. Action items should be linked to regulations listed for these zones.
Silverton Transportation System Plan	2008	City of Silverton	Outlines the future transportation needs for the city of Silverton through 2030	• Mitigation actions relating to improving transportation facilities should be linked with goals and policies found in the Transportation System Plan.
Silverton Parks and Recreation Master Plan	2008	City of Silverton	The Silverton Parks and Recreation Master Plan provides a vision and framework for valuing and investing in Silverton's parks.	• Mitigation actions relating to improving park areas should be linked with actions and policies found in the Parks and Recreation Master Plan.
Silverton Wastewater System Facility Plan	2007	City of Silverton	Plan addresses waste water needs for Silverton for next 10 years.	• Mitigation actions should be aligned with the measures and policies found in the Wastewater System Facility Plan.
Silverton Emergency Operations Plan (EOP)	February 2009	City of Silverton	The plan provides a framework for a coordinated response and recovery during any type or size of emergency.	• While the EOP deals primarily with emergency response and recovery, mitigation actions should be coordinated and/or integrated within the recovery strategy to reduce the future impacts of hazard events.
Silverton Downtown Master Plan	2007	City of Silverton	Accompanies Silverton Comprehensive Plan to evaluate and recommend development standards and design guidelines and enhance multi-modal transportation in downtown Silverton.	• Mitigation actions for the downtown area should be aligned with the goals and policies found in the Silverton Downtown Master Plan.
Silverton Dam Emergency Action Plan	February 2009	City of Silverton	A plan to safeguard lives and protect property should the Silverton Dam fail. Includes procedures for mitigation, preparedness, response, and recovery	The Silverton Dam Emergency Action Plan contains mitigation actions that can inform Silverton's larger mitigation strategy.

Community Organizations & Programs

Social systems can be defined as community organizations and programs that provide social and community-based services, such as health care or housing assistance, to the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. Often, actions identified by the plan involve communicating with the public or specific subgroups within the population (e.g. elderly, children, low income). The county and its cities can use existing social systems as resources for implementing such communication-related activities because these service providers already work directly with the public on a number of issues, one of which could be natural hazard preparedness and mitigation.

Table 9 below highlights community organizations and programs within the city that may be potential partners for implementing mitigation actions. The table includes information on each organization or program's service area, types of services offered, populations served, and how the organization or program could be involved in natural hazard mitigation. The three involvement methods include:

Education and outreach: organization could partner with the community to educate the public or provide outreach assistance on natural hazard preparedness and mitigation.

Information dissemination: organization could partner with the community to provide hazard-related information to target audiences.

Plan/project implementation: organization may have plans and/or policies that may be used to implement mitigation activities or the organization could serve as the coordinating or partner organization to implement mitigation actions.

Table 9. Silverton Community Organizations

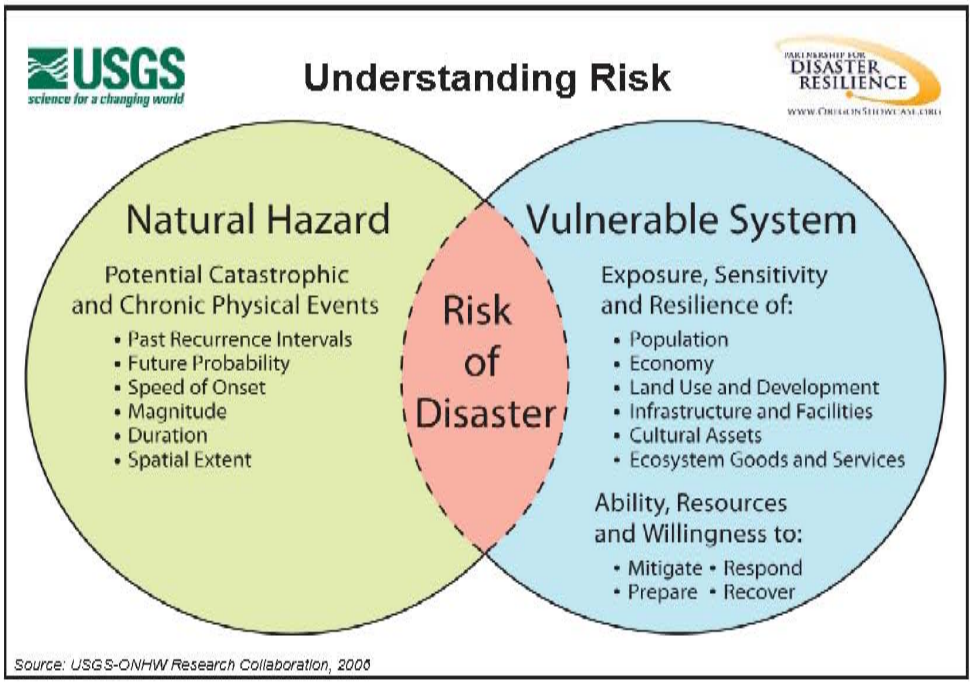
Name and Contact Information	Description	Service Area	Populations Served						Involvement with Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Silverton Chamber of Commerce 426 S Water St Silverton, OR 97381 (503) 873-5615	Represents the local businesses and disseminates information to businesses and visitors.	City of Silverton and surrounding region	✓						• Education and outreach • Information dissemination
Silverton Community Outreach Clinic 208 S Water St Silverton, OR 97381 (503) 873-0815	Clinic operated by the Silverton Hospital for lower income community members.	City of Silverton and surrounding region		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination
Silverton Hospital 342 Fairview St Silverton, OR 97381 (503) 873-1789	Not-for-profit hospital providing medical services to the surrounding community.	City of Silverton and surrounding region		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination
Silver Falls Family YMCA 1 421 S. Water St Silverton, OR 97381 (503) 873-0205	Community health and fitness center	City of Silverton		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination
Silverton Together 421 S. Water St Silverton, OR 97381 (503) 873-0405	Non-profit organization to strengthen and support families by promoting health and well-being of children and families.	City of Silverton		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination
Silverton Lion's Club PO Box 552 Silverton, OR 97381	Community organization	City of Silverton	✓	✓	✓	✓	✓	✓	• Education and outreach • Information dissemination
Silverton Rotary Club PO Box 132 Silverton, OR 97381	Local business and community organization	City of Silverton	✓	✓	▪	▪	✓	✓	• Education and outreach • Information dissemination
Silverton Country Historical Society 428 S Water St Silverton, OR 97381 (503) 873-7070	Community historical society	City of Silverton	✓	✓	✓	✓	✓	✓	• Education and outreach • Information dissemination

Name and Contact Information	Description	Service Area	Populations Served						Involvement with Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
Silverton Elks Lodge # 2210 300 High St Silverton, OR 97381	Community organization	City of Silverton	✓			✓		✓	• Education and outreach • Information dissemination
Kiwanis Club of Silverton PO Box 754 Silverton, OR 97381 (503) 873-4372	Community organization	City of Silverton		✓			✓		• Education and outreach • Information dissemination
Silver Falls School District 1456 Pine St Silverton, OR 97381	Local school district.	Silverton and surround area		✓	✓		✓	✓	• Education and outreach • Information dissemination
Silverton Area Senior Center 402 East Main Street Silverton, OR 97381 (503) 873-3093	Senior community organization	City of Silverton			✓	✓			• Education and outreach • Information dissemination
ALC Davenport House 930 Oak St Silverton, OR 97381 (503) 873-7162	Assisted living community	City of Silverton			✓	✓	✓	✓	• Education and outreach • Information dissemination
Marquis Care at Silver Gardens 115 S. James St Silverton, OR 97381 (503) 873-5362	Assisted living community	City of Silverton			✓	✓			• Education and outreach • Information dissemination

Section 3:
Risk Assessment

This section expands on Marion County's Natural Hazards Mitigation Plan by addressing Silverton's unique risks to the following natural hazards: drought, earthquake, flood, landslide, volcano, wildfire, windstorm, and severe winter storm. The information in this section was paired with information from Section 2 Community Profile during the planning process in order to identify issues and develop actions aimed at reducing overall risk, or the area of overlap in Figure 6 below.

Figure 6 Understanding Risk[xxi]



The following hazard assessments describe each hazard's probability of future occurrence within Silverton, as well as the city's overall vulnerability to each hazard. In order to facilitate connections with Marion County and the state of Oregon's probability and vulnerability rating systems, the city of Silverton used the same rating scales as provided within Oregon Emergency Management's Hazard Analysis Methodology template. (See Marion County's Hazard Analysis scores in Appendix A. Rating scales are listed below). Note that the city did not complete a full hazard analysis. Probability estimates are based on the frequency of previous events, and vulnerability estimates are based on potential impacts that were discussed during the April 15th risk assessment workshop.

> **Probability** scores address the likelihood of a future major emergency or disaster within a specific period of time as follows:
>
> *High* = One incident likely within a 10-35 year period
> *Moderate* = One incident likely within a 35-75 year period

Low = One incident likely within a 75-100 year period

Vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected
Moderate = 1-10% affected
Low = Less than 1% affected

Because Marion County's Natural Hazards Mitigation Plan (NHMP) does not provide probability and vulnerability estimates, all references to Marion County's probability and vulnerability rankings are referencing Marion County's 2006 Hazard Analysis document (see Appendix A). When Marion County's NHMP is updated in 2012, the county's steering committee will incorporate probability and vulnerability ratings in the NHMP.

Drought

The Marion County Natural Hazards Mitigation Plan adequately identifies the causes and characteristics of drought within the region, as well as historical drought events. Droughts can affect all segments of a jurisdiction, particularly those employed in water-dependent activities (e.g., agriculture, recreation, etc.) Additionally, public water providers can experience shortages. The extent (i.e., magnitude or severity) of a drought depends upon the degree of moisture deficiency, and the duration and size of the affected area.

Droughts are a fairly rare occurrence in Silverton, although they're possible if the region has a particularly dry winter season. The climate is typically mild with wet winters and dry summers, and rainfall averages about 47 inches per year.[xxii] According to Marion County's Natural Hazards Mitigation Plan, two major droughts have occurred in the past 33 years. The period between 1976 and 1977 was the single driest year of the century. Similarly, February 2005 was the driest February on record since 1977. Given the frequency of past events, Silverton estimates a high probability that droughts will occur in the future. (Note: Marion County does not estimate probability or vulnerability ratings for drought-related events. As such, Silverton is unable to say whether its vulnerability and probability estimates are greater than the county's.)

The city of Silverton has a water storage capacity of 4.5 million gallons, and additional water storage in the Silverton Reservoir. Because the city has adequate storage capacities, the city estimates a low vulnerability to drought events. Due to expected changes and unpredictability in climate patterns, the city acknowledges uncertainty in this estimate, and will re-evaluate conditions when this plan is updated.

Portions of a community that are typically affected by droughts include those that depend on agriculturally-based operations, water-dependent recreational activities, and water-borne transportation systems. Domestic water-users may also be subject to conservation measures and/or could be

faced with significant increases in electricity or water rates. Additionally, droughts can have severe environmental consequences. A prolonged drought in forests promotes an increase of insect pests, which in turn damages trees that are already weakened by a lack of water. Likewise, a moisture-deficient forest constitutes a significant fire hazard.

Earthquake

The Marion County Natural Hazards Mitigation Plan adequately describes the causes and characteristics of earthquake hazards for the region. Earthquakes are fairly infrequent occurrences, but have affected Marion County and Silverton in the past. The city of Silverton agrees that the county's historical account is accurate, and noted that the 1993 Scotts Mills earthquake caused damage to Silverton's City Hall, and a brick building on West Main Street.

Marion County's Natural Hazards Mitigation Plan adequately describes the location of potential earthquakes as well. Figures 7-10 below further detail the potential extent of earthquake hazard for Silverton. As shown in Figure 7, the majority of the city has a low to moderate risk of experiencing amplification in a high magnitude earthquake, although areas immediately of the city are at high risk of experience amplification hazards. The same is true for liquefaction hazards and earthquake-induced landslide hazards.

When determining the probability of earthquakes, it is difficult to estimate the recurrence intervals from available data. Paleoseismic studies along the Oregon coast indicate that the state has experienced seven Cascadia Subduction Zone (CSZ) events possibly as large as M9 in the last 3,500 years. These events are estimated to have an average recurrence interval between 500 and 600 years, although the time interval between individual events ranges from 150 to 1000 years. Since Marion County's NHMP was developed in 2007, better earthquake probability estimates have surfaced. Scientists now estimate that the chance in the next 50 years of a great subduction zone earthquake is between 10 and 20 percent assuming that the recurrence is on the order of 400±200 years.[xxiii] Crustal and deep intraplate earthquakes remain difficult to predict.

Marion County estimates a high probability that earthquakes will occur in the future, as well as a high vulnerability to earthquake events. Both ratings are also true for the city of Silverton. The extent of structural damages, injuries and deaths will depend on the type of the earthquake, the city's proximity to the epicenter, and the magnitude and duration of the event. Potential earthquake-related impacts are well-documented in Marion County's NHMP, but buildings, dams, transportation systems, utility and communication networks, and lifelines including water, sewer, storm-water and gas lines are particularly at risk. Additionally, damages to roads and water systems will make it difficult to respond to post-earthquake fires. The following vulnerabilities / potential impacts were identified by the city's steering committee and stakeholders:

- Silverton's City Hall is located in an older unreinforced masonry building that houses city government offices and the police department. The steering committee believes that this building could be damaged in the event of an earthquake. *Note: this issue was a top concern for Silverton's steering committee.*
- As described in Table 5 above, 67% of Silverton's housing was built before 1980. Older homes are at a greater risk of damage from earthquake events. Structures built after the late 1970s in the Northwest used earthquake resistant designs and construction techniques.
- The city's downtown area houses small businesses, financial institutions, government institutions, and several nonprofits. Many historic downtown buildings are comprised of unreinforced masonry, and would likely be vulnerable to high magnitude earthquake events. As shown city's Cascadia Peril Earthquake Scenario map below in Figure 10, 70-100% of Silverton's downtown area is likely to be damaged in a high magnitude earthquake event.
- Tourist and transient populations are particularly vulnerable to earthquake hazards because they may require special accommodations for food and shelter in the aftermath of an event. Likewise, the historic downtown area serves as a major tourist draw, and destruction of these historic resources could reduce tourist activity in the community.
- Silverton has a high percentage of people who speak English as a second language, which include Hispanics and Russian Old Believers. Because of linguistic or cultural differences, these populations may need targeted education and outreach regarding earthquake preparedness, mitigation, and response practices.
- Stable transportation networks are necessary for economic continuity and emergency service provisions. The three bridges that cross Silver Creek could be vulnerable to seismic activity; likewise, damages to Highways 213 and 214 were noted as a potential concern.
- Damages to Silverton's industrial and agricultural facilities, such as local farms and the Bruce-Pac facility (a meat products company and Silverton's largest industry) could hurt local employment and property tax receipts. Likewise, Bruce-Pac contains hazardous materials, namely anhydrous ammonia, which if released in an earthquake can harm or kill employees and residents. Farm stores such as Wilco also contain large quantities of fertilizer, which when mixed due to an earthquake can cause hazardous gases, potentially harming the environment.
- Silverton's sewage treatment plant could be vulnerable to seismic activity. If damaged, the treatment plant could release raw sewage into Silver Creek, the city's water source.
- Silverton's water intake facilities and water distribution infrastructure could be damaged in an earthquake, limiting

residents' and emergency responders' ability to access water. Other utility infrastructure, such as the Verizon switch station, cell phone towers, PGE station, gas lines, and sewer lines could also be damaged in an earthquake event.

- The Silverton Dam could be damaged in the event of an earthquake, causing flooding in downtown Silverton and in adjacent residential neighborhoods. The city has completed an Emergency Action Plan (EAP) to mitigate, prepare for, respond to, and recover from a dam failure.
- The city of Silverton has inadequate housing availability for residents post-disaster.

In 2007, the Department of Geology and Mineral Industries (DOGAMI) conducted a seismic needs assessment for public school buildings, acute inpatient care facilities, fire stations, police stations, sheriffs' offices, and other law enforcement agency buildings.[xxiv] Buildings were ranked for the "probability of collapse" due to the maximum possible earthquake for any given area. Within the city of Silverton, the following buildings were given a "high" or "very high" probability of collapse rating:

- Mark Twain Middle School: *high (> 10%)*
- Robert Frost Elementary School: *high (> 10%)*
- Eugene Field Elementary School: *high (> 10%)*
- Silverton High School (Schlador St. Campus): *very high (100%)*
    - Note: a new high school is currently under construction, and will replace the Schlador St. Campus building

Please refer to Marion County's NHMP for more detail regarding earthquake-related hazards, issues, and estimated vulnerabilities and/or damages in given scenarios. Existing earthquake mitigation activities are also well-documented within Marion County's NHMP.

Figure 7 Silverton Amplification Hazard

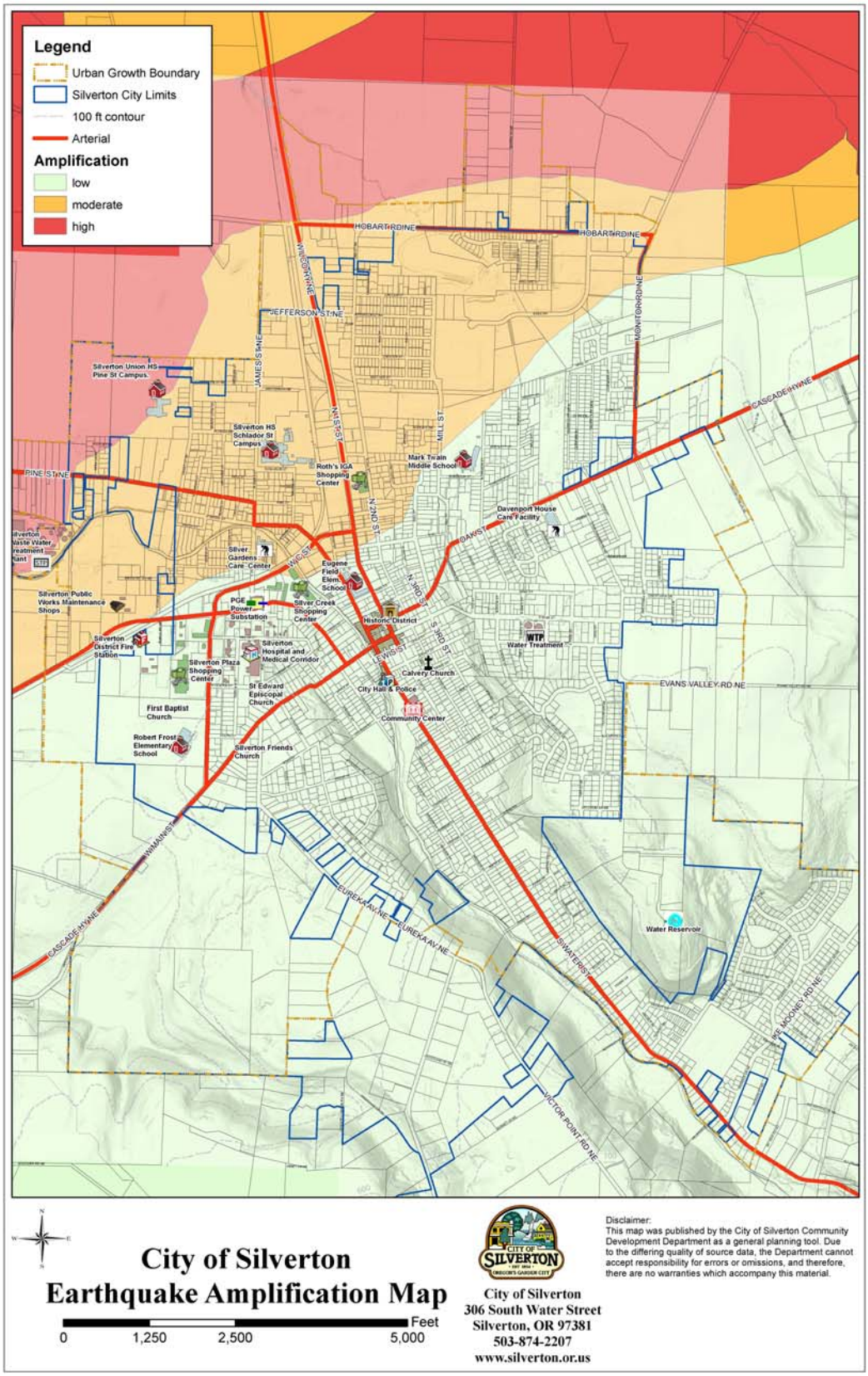


Figure 8 Silverton Liquefaction Hazard

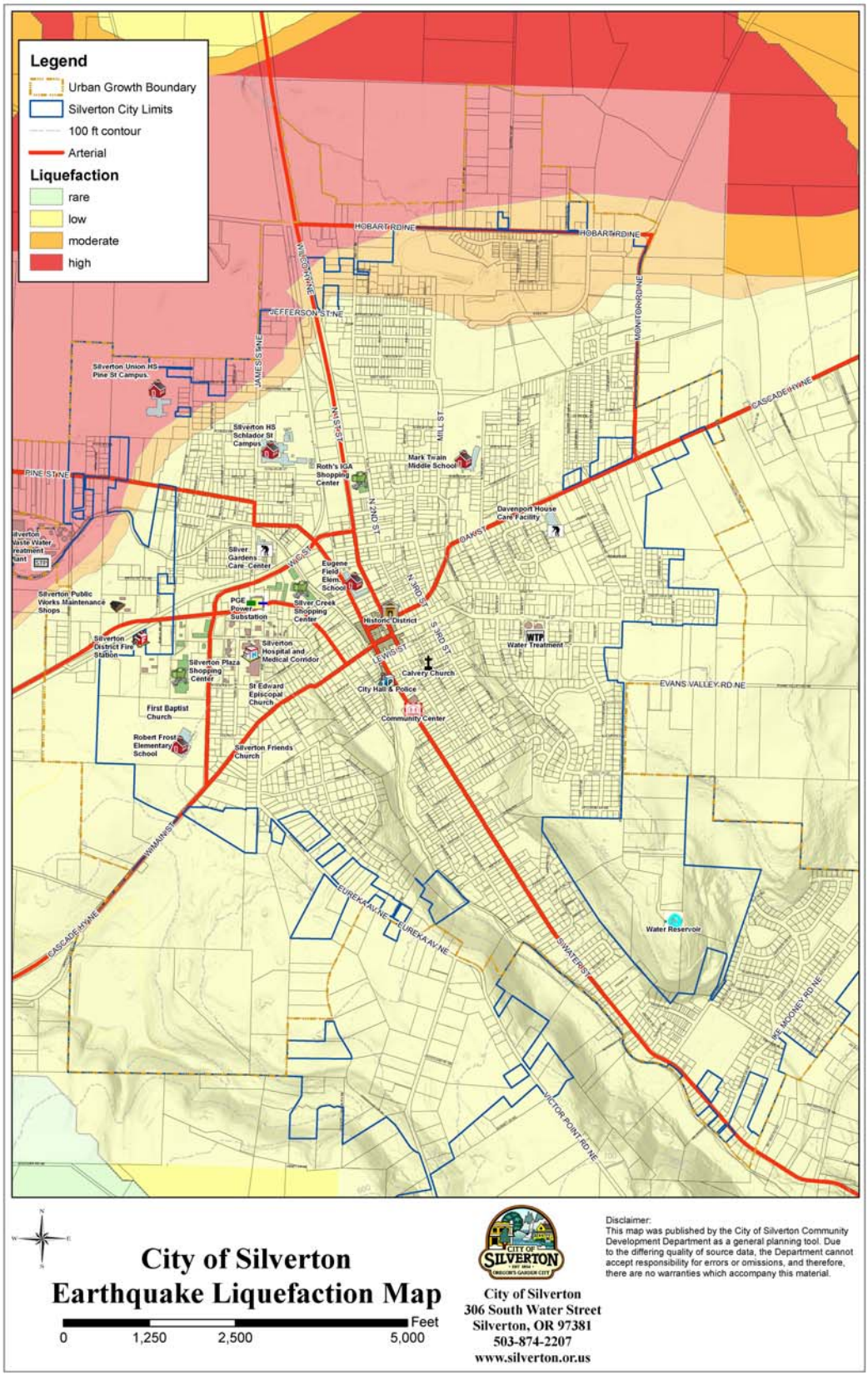


Figure 9 Silverton Earthquake-Induced Landslides Hazard

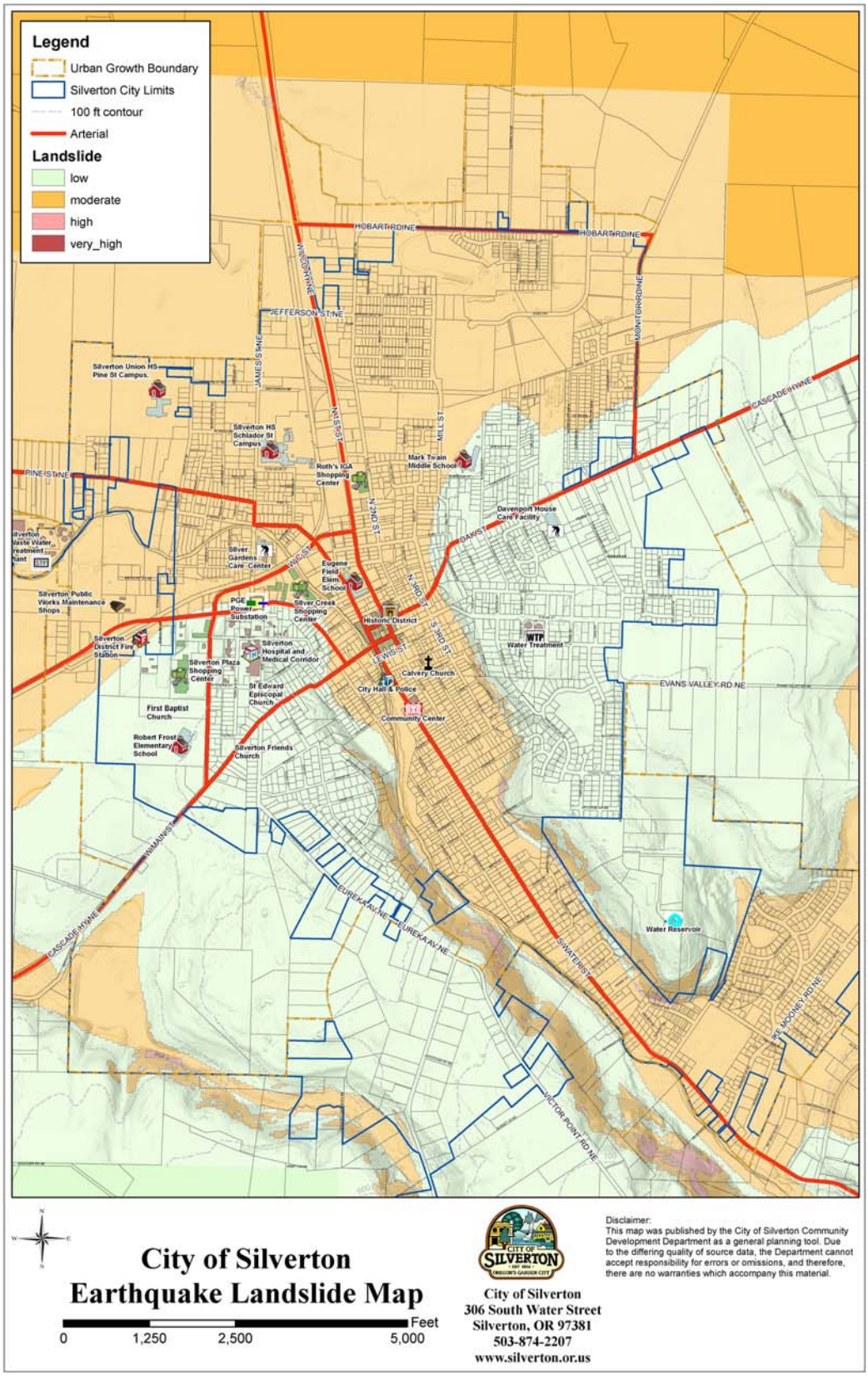
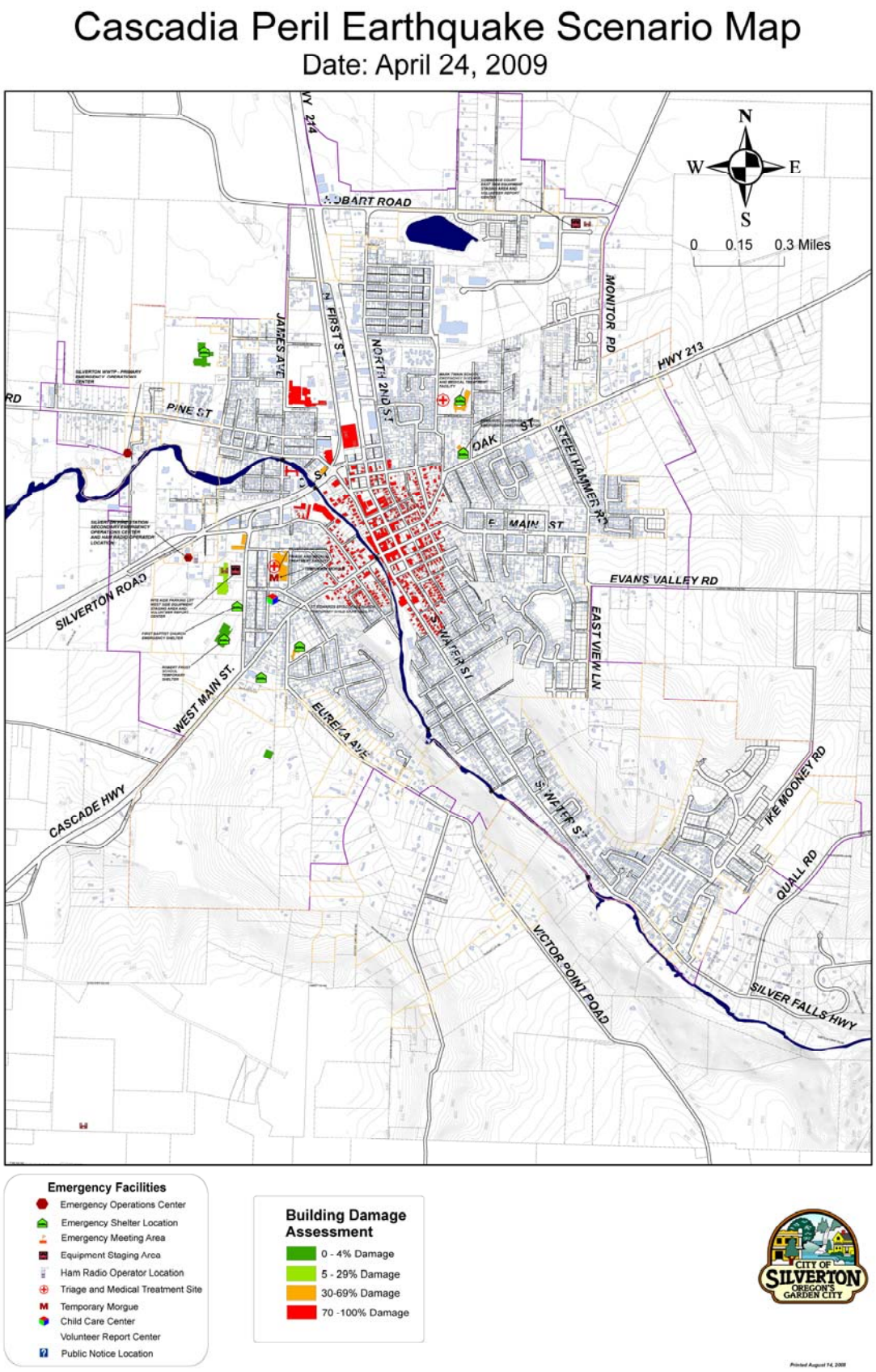


Figure 10 Silverton Cascadia Peril Earthquake Scenario Map (Date: April 24, 2009)



Flood

The Marion County Natural Hazards Mitigation Plan adequately describes the causes and characteristics of flooding for the region, as well as the history of major flooding events.[xxv] Table 10 summarizes the major flooding events that that have specifically occurred within the city of Silverton.

Table 10. Silverton Historic Flooding Events

Date	Flooding Event
January 1997	Flooding from heavy rains in Marion County; state of emergency declared for county.
November 1996	Period of heavy rains cause damage in Marion County, no noted damage to Silverton.
February 1996	Heavy rains caused major flooding in the Willamette Valley. Heavy flooding in Silver Creek caused damage to the C Street Bridge. Major debris pileup on the James Avenue Bridge and in the Silverton Reservoir.
1964	Major flooding on Silver Creek.

Source: Marion County Natural Hazards Mitigation Plan, 2005.

The location of Silverton's flooding hazard is best described within the city's 100-year floodplain map shown in Figure 11 below. The primary flood source in Silverton is Silver Creek. Forty-eight acres within the city are in the floodplain, and 204 properties (or 107 acres) intersect the floodplain. The total value of those 204 properties is $77,172,290.

The extent of flooding hazards in Silverton primarily depends on climate and precipitation levels. Withdrawals for irrigation and drinking water, as well as stream and wetland modifications or vegetation removal can influence water flow as well.

The city has been a participant in the National Flood Insurance Program (NFIP) since September 1974, and Silverton's current effective Flood Insurance Rate Map (FIRM) is dated January 2nd, 2003. As of January 31st, 2009, the city has 77 NFIP policies in force at a total value of $15,549,300. There have been 13 claims, 11 of which are closed. Two losses have closed without payment. Total loss payments amount to $65,938. Notably, Silverton has no identified repetitive loss properties. Silverton's last Community Assistance Visit (CAV) occurred on March 31st, 1995. No visits or Community Assistance Contacts (CAC) have occurred since 1995.

To mitigate the impacts of a future flood event, Silverton enforces a flood overlay zone that requires the following building standards:[xxvi]

A. The lowest floor, including basement, of any proposed structure (including manufactured homes and nonresidential structures) shall

be placed at least three feet above the 100-year flood as determined by the latest Federal Insurance Study.

B. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

C. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

D. Electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

E. All manufactured homes shall be on an adequately anchored, permanent foundation and be anchored to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, the use of over-the-top or frame ties to ground anchors (reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional details).

F. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement and shall be installed or constructed using materials, methods, and practices that minimize flood damage.

G. All new and replacement public water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.

H. All new and replacement public sanitary sewer systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharges from the system into flood water. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

I. Property owners or developers shall file with the city a certificate whose format is acceptable to FEMA. This certificate must be approved by the building official, prepared by a registered surveyor or professional engineer, architect or surveyor, and maintained for public inspection. The certificate must contain:

    1. The actual elevation (in relation to mean sea level) of the lowest floor including basement;
    2. The elevation of any flood-proofing; and
    3. Whether or not the structure contains a basement.

J. If flood-proofing methods are required as per subsection (B) of this section, the property owners or developers shall file with the city certification by a registered professional engineer or architect that the

flood-proofing methods meet or exceed FEMA standards. (Ord. 08-06 § 3, 2008)

Marion County estimates a high probability that flooding will occur in the future, and a moderate vulnerability to flood hazards. Both ratings are true for the city of Silverton as well. A number of population groups are vulnerable to flooding hazards in Silverton. The Marquis Care Center at Silver Gardens, an elderly care facility, is located in the 100-year floodplain and had to be evacuated in 1996 due to flooding. The elderly are especially vulnerable to floods because they may require evacuation assistance due to mobility and health issues or reluctance to evacuate. Elderly populations may also require special medical equipment at shelters,[xxvii] and are more likely to lack social and economic resources to recover.[xxviii]

Homes near Silver Creek on James, Brook, Willow, Alder, and Silver Streets are also located in the 100-year floodplain, and these areas flooded during the 1996 floods. Mill and Lincoln Streets are also subject to cyclical flooding events. Likewise, the city's water supply may be compromised in the event of a flood. Currently Silverton's water supply comes from Abiqua and Silverton Creeks, and a flood could contaminate these water sources or damage the water intake facilities. In addition, the city's wastewater treatment plant lies in the 100-year floodplain, and a flood could both damage the facility and release untreated sewage into Silver Creek.

The Silver Creek Dam is one of two water sources for the city, and provides a measure of flood control for Silver Creek. In an extremely unlikely flood event, such as very heavy rain followed by snow melt, or debris blockage in the dam, water in the Silver Creek Reservoir could overtop the dam causing damage to the dam (see Figure 12, Inundation Scenario Map below). However, as noted in the Silverton Dam Emergency Action Plan, this event is highly unlikely and the dam provides an adequate level of safety against overtopping.

Figure 11 City of Silverton Floodplain Map

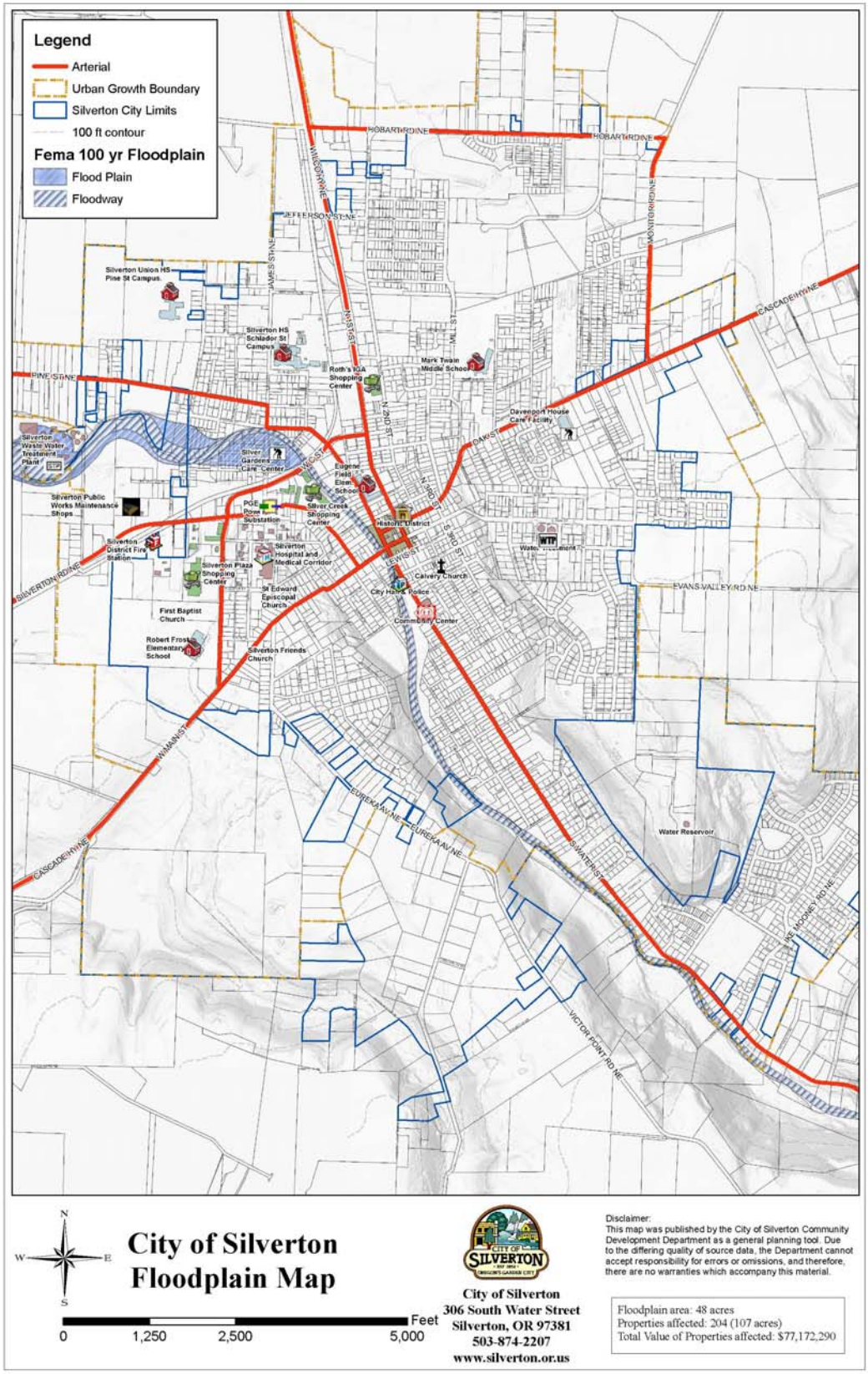
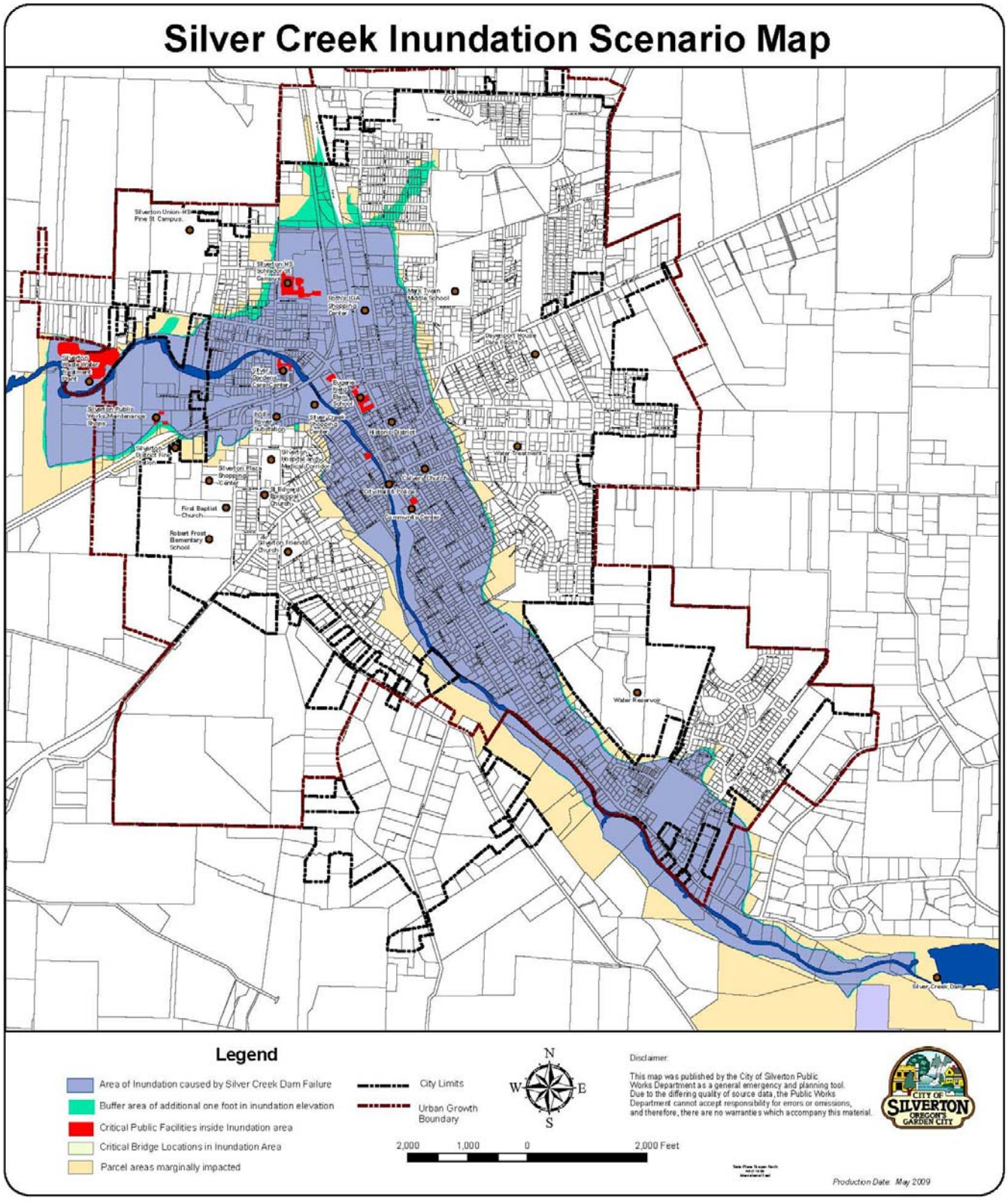


Figure 12 Silver Creek Inundation Scenario Map



Landslide

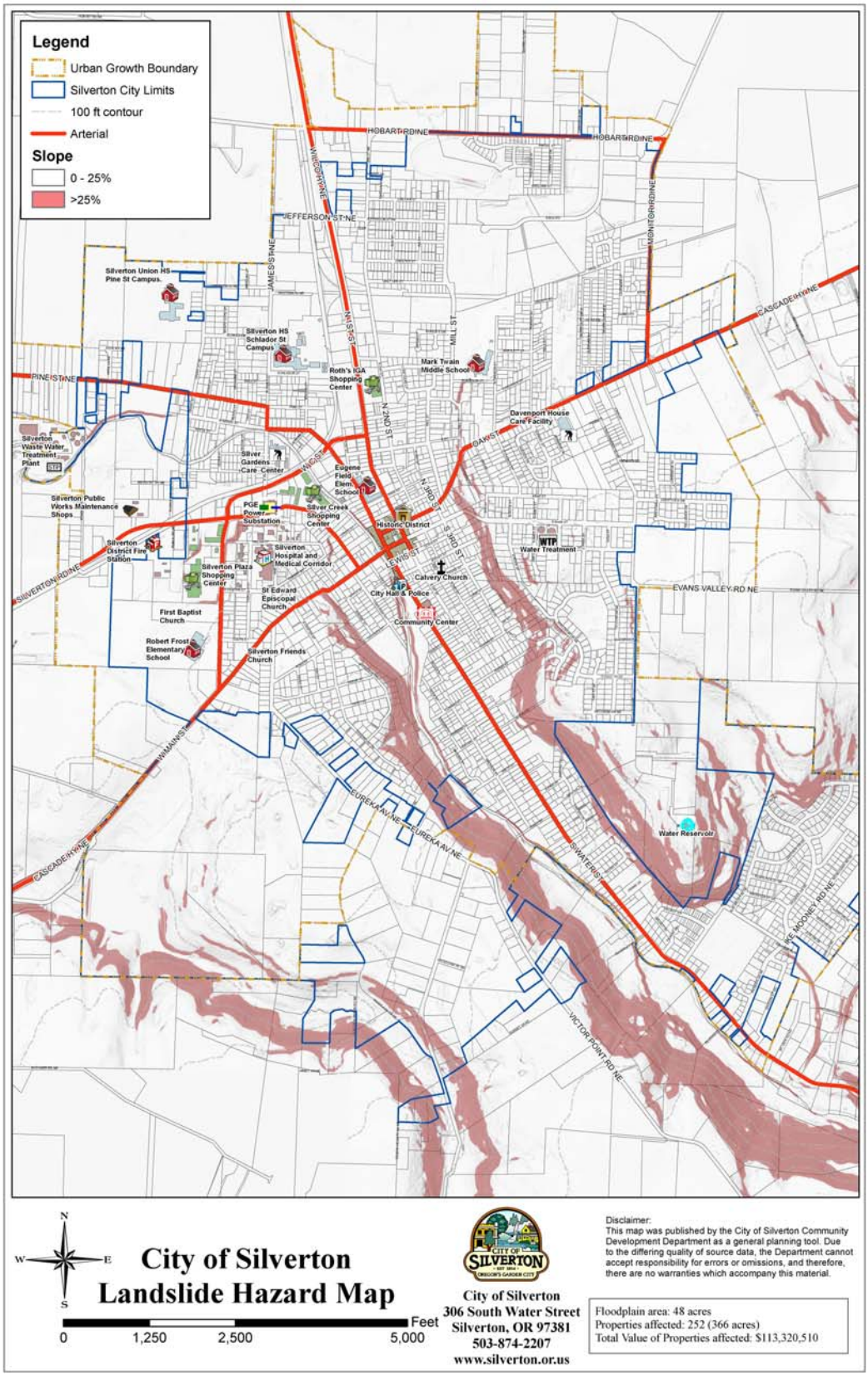
The Marion County NHMP adequately describes the causes, characteristics, location and extent of landslides for the region. Currently, there is no comprehensive list of landslide events and/or dates for Marion County[xxix], and the same is true for the city of Silverton.

As shown in Figure 9 above, Earthquake-Induced Landslide Hazard, Silverton's likelihood of experiencing earthquake-induced landslides ranges from low to moderate. Although the earthquake-induced landslide map cannot be used to predict the occurrence of non-earthquake induced landslides, it does show areas of increased slope. Additionally, Figure 13 below shows areas within Silverton that have a slope greater than 25 degrees. Although the likelihood of landslides occurring on these slopes is unknown, the city can infer that these steep-sloped areas may be vulnerable to slides caused by heavy rainfall or changes in vegetative cover. To conduct a better risk assessment, more information would be needed regarding soils, material content, vegetative cover, and the nature of underlying materials.

The city of Silverton implements a hillside development overlay to protect the city's natural and topographic character, environmental resources, aesthetic qualities, and the general welfare of citizens. The overlay additionally ensures that developments do not create soil erosion, sedimentation of lower slopes, slide damage, flooding problems, and severe cutting or scarring. Hillside development standards apply to all areas that have an average slope of 12% or higher. In addition to employing building location/design standards, the city regulates grading, cut, storm drainage, driveways, trees, and re-vegetation applications. Please see Silverton's Municipal Code, Section 2.6 for more information regarding the Hillside Protection Overlay District.

Marion County does not estimate probability or vulnerability ratings for landslide hazards. Due to the city's topography, Silverton estimates a moderate probability that landslides will occur within city limits. Additionally, Silverton estimates a moderate vulnerability to landslide events, meaning 1-10% of Silverton's population or community assets could be affected by a landslide event. Depending upon the type, location, severity and area affected, severe property damage, injuries and loss of life can be caused by landslide hazards. Landslides can damage or temporarily disrupt utility services, roads and other transportation systems and critical lifeline services such as police, fire, medical, utility and communication systems, and emergency response. In additional to the immediate damage and loss of services, serious disruption of roads, infrastructure and critical facilities and services may also have longer term impacts on the economy of the community and surrounding area. Highway 214 is of particular concern to Silverton's steering committee.

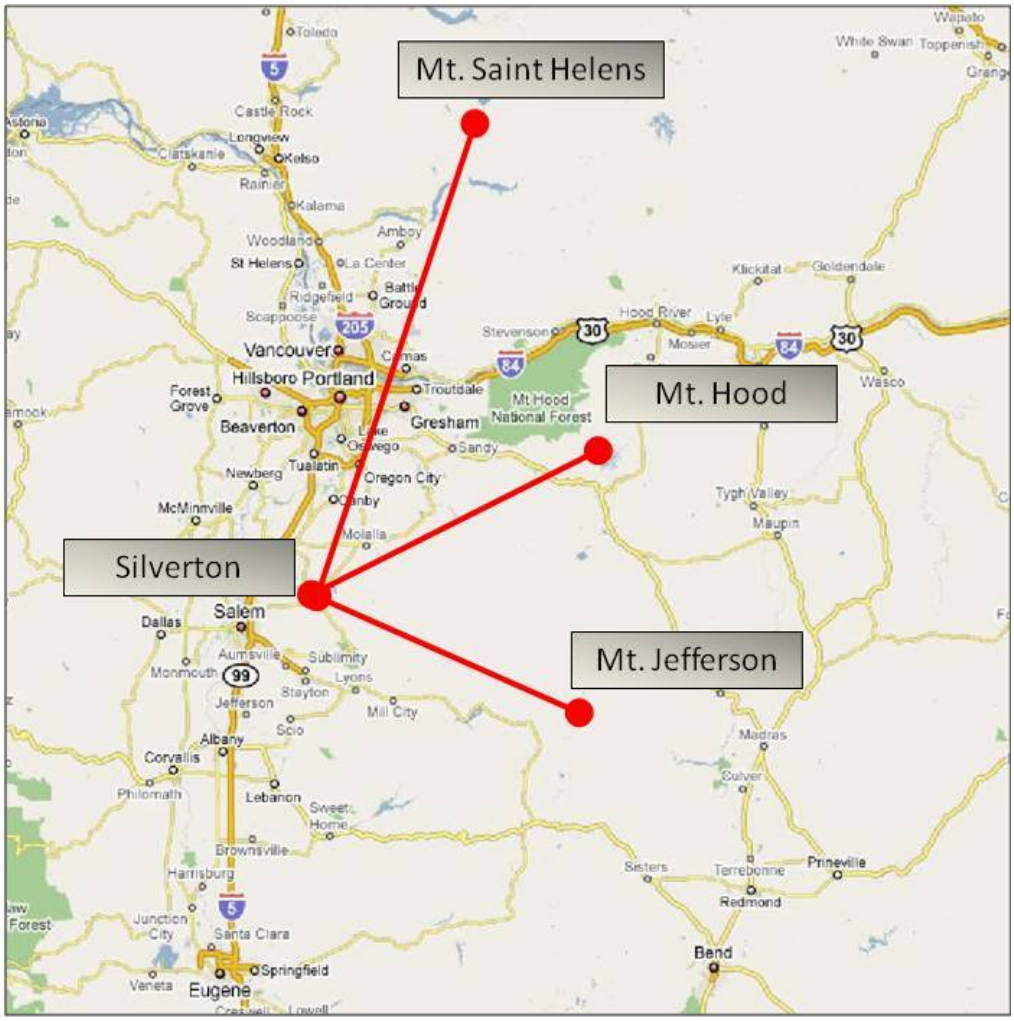
Figure 13 Silverton Landslide Hazard



Volcano

Marion County's NHMP adequately describes the causes and characteristics of volcano-related hazards, as well as the location of volcanic areas and the extent of potential damages. Immediate danger areas for volcanic eruptions lie within a 20-mile radius of the blast site,[xxx] and ashfall is likely to affect communities downwind of the eruption. Mount Hood and Mount Jefferson are the closest of the cascade volcanoes to Silverton, and ashfall from Mount Saint Helens has reached Silverton in the past (see Figure 14 below). Additionally, Mount Adams is located north of Mount Hood, and the Three Sisters lie to the south of Mount Jefferson.

Figure 14. Mt. Hood, Mt. Jefferson, and Mt. Saint Helens's Locations in Relation to the City of Silverton



Due to Silverton's distance from volcanoes, the city is unlikely to experience the immediate effects that eruptions have on surrounding areas (i.e., mud and debris flows, or lahars). Depending on wind patterns, however, the city may experience ashfall. The eruption of Mount St.

Helens in 1980, for example, coated the Willamette Valley with a fine layer of ash.

Mount Jefferson's last eruptive episode culminated about 15,000 years ago. The volcano is capable of large explosive eruptions, meaning areas downwind are at risk of experiencing ashfall. The largest eruption of Mount Jefferson occurred between 35,000 and 100,000 years ago, and caused ash to fall as far away as the present-day town of Arco in southeast Idaho. Although an event has not occurred in a long time, experience at explosive volcanoes elsewhere suggests that Mount Jefferson cannot be regarded as extinct.[xxxi]

Mount Hood's last eruption ended shortly before the arrival of Lewis and Clark in 1805. When Mount Hood erupts again, it will severely affect areas on its flanks and far downstream in the major river valleys that head on the volcano. Likewise, volcanic ash may fall on areas up to several hundred kilometers downwind.[xxxii] Please see Marion County's NHMP for more details regarding Mt. Hood and Mt. Jefferson, as well as additional Cascade volcanoes.

Marion County estimates a low probability that volcanic eruptions will occur in the future, and a moderate vulnerability to volcanic events. Both ratings are true for the city of Silverton as well.

Hazards related to volcanic eruptions (i.e., potential community impacts) are adequately described in the Marion County NHMP. Although the city of Silverton is unlikely to experience lahars or lava flows, tephra (sand-sized or finer particles of volcanic rock that is ejected rapidly into the air from volcanic vents) drifts downwind from explosions and can form a blanket-like deposit of ash. Tephra is a public health threat, and can damage agriculture and transportation systems (i.e., aircraft and on-the-ground vehicles). Tephra can also clog drainage systems and create major debris management problems. Within Silverton, public health would be a primary concern, and keeping transportation routes open/accessible would be important as well.

Wildfire

The Marion County Natural Hazards Mitigation Plan accurately describes the causes and characteristics of wildfire in Marion County, as well as the history of wildfire events. Silverton has one recorded wildfire event which occurred in 1865, and burned 988,000 acres. To date, this is Oregon's largest wildfire, but no additional wildfires have occurred in Silverton since then.

As mentioned in the Marion County NHMP, the wildland-urban interface is not designated by geography alone, and certain conditions must be present for significant interface fires to occur (i.e., hot, dry, windy weather; inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm resources; and a large fuel

load, or dense vegetation). Likewise, the severity of a wildfire is affected by the severity of these conditions.[xxxiii] Please see Marion County's NHMP for a more comprehensive description of the conditions that create and/or exacerbate wildfire events.

Within the Marion County Community Wildfire Protection Plan (CWPP), the city of Silverton is listed as a "Community at Risk." The term "at-risk community" means an area --

(A) That is comprised of – (i) an interface community as defined in the notice entitled "Wildland Urban Interface Communities Within the Vicinity of Federal Lands That Are at High Risk From Wildfire'' issued by the Secretary of Agriculture and the Secretary of the Interior in accordance with title IV of the Department of the Interior and Related Agencies Appropriations Act, 2001 (114 Stat. 1009) (66 Fed. Reg. 753, January 4, 2001); or (ii) a group of homes and other structures with basic infrastructure and services within or adjacent to Federal land;

(B) In which conditions are conducive to a large-scale wildland fire disturbance event;

(C) For which a significant threat to human life or property exists as a result of a wildland fire disturbance event. [xxxiv]

Figure 15 below shows the wildfire areas of concern for the city of Silverton.

Marion County estimates a moderate probability that wildfires will occur in the future. Given Silverton's developmental proximity to wildland areas, a moderate probability rating is accurate for the city as well. According to Marion County's CWPP, Silverton's "fire behavior potential" is influenced by the moderate slopes in the community, broken moderate fuels, and some ladder fuels. The composition of surrounding fuels is conducive to torching and spotting.[xxxv]

Marion County estimates a moderate vulnerability to wildfire events. Because the city has several wildland-urban interface areas (see Figure 15 below), Silverton estimates a high vulnerability to wildfire events. The following vulnerabilities were identified by the city's steering committee on April 15th, 2009:

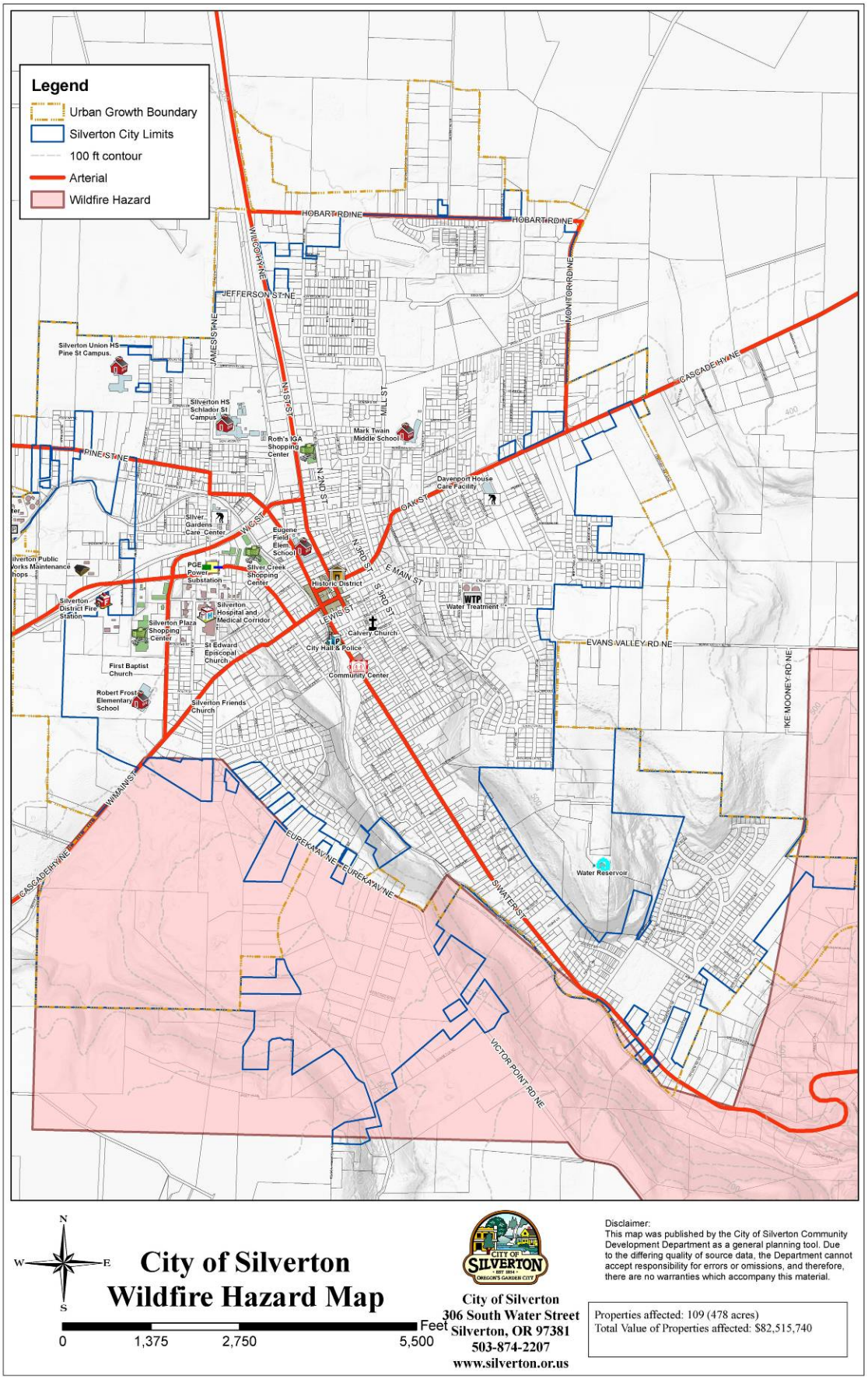
- Residents who live in the wildland urban interface are a risk to wildfire hazards. These areas include residences in the hills along East Hill and the Eureka, Woodland, and Edison Roads.
- Children, the elderly, asthma sufferers, and hospital patients may be vulnerable to smoke inhalation or excessive ash fall caused by wildfires.

- Silverton has a high number of non-English speaking populations, including Hispanic populations and Russian Old Believers, who may not understand the risks wildfires pose due to cultural or linguistic differences.
- The Oregon Garden is a major tourist attraction for the city. If damaged by wildfire, the city would experience economic side-effects.
- Wildfires can have a significant impact on local environmental assets. Wildfires can disrupt the intake of water on Abiqua and Silver Creek, either by damaging intake systems or polluting the water source, both of which could disrupt the city's water supply. City parks such as the Coolidge McClaine Park could be significantly damaged by wildfires as well.
- The city needs to identify emergency shelters to house populations post-disaster (for wildfire and all other hazards as well).

Silverton has some wildfire protection measures in place for hillside developments (Title 18, Chapter 2.6.100), but does not state land use protection measures in other residential, commercial, or industrial zones. However, Silverton is considering a Scenic Overlay Zone which will have standards for fire protection areas around homes. Silverton also has limited infrastructure to fight wildfires. This includes a limited number of access routes, limited water supplies, moderate grades, and limited firefighting capability in the city.

For more information about potential wildfire-related impacts (i.e., general impacts), please see Marion County's Natural Hazards Mitigation Plan.

Figure 15 Silverton Wildfire Hazard



Windstorm

The Marion County Natural Hazards Mitigation Plan adequately describes the causes, characteristics, location, and extent of the windstorm hazard. Marion County's plan also describes historical wind storm events. Significant recent events that have impacted Marion County, including Silverton, are described in Table 11 below.

Table 11. Historical Wind Storm Events

Date	Wind Storm Event
March 2008	Windstorm measured at 40 mph toppled trees in Woodburn.
February 2006	Windstorms with gusts up to 77 mph cause $227,000 in damages in Linn, Lane, Marion, Benton, Polk, and Yamhill Counties.
January 2006	Windstorm with winds up to 58 mph caused a total of $500,000 in damages spread out over Yamhill, Marion and Polk Counties, as well as Clackamas, Columbia, Washington, and Multnomah Counties.
January 2005	Windstorms caused $6,000 in damages within Linn and Marion Counties. A storm total of $15,000 in damages spread out among Linn, Marion, Clackamas, Multnomah, and Washington Counties.
December 2004	$6,250 in property damage to Marion, Lane, and Polk Counties.
February 2002	Willamette Valley had wind gusts of 70 mph. Led to presidentially declared disaster in several western counties. (Marion County was not included in the disaster declaration, but still experienced significant impacts.
December 1995	Windstorm in Salem, caused $500,000 in damage in Woodburn, 20,000 people in Silverton and Woodburn lost power.
November 1981	Winds in Salem at 52 mph, 23 power lines down on Silverton Road.
March 1971	50 mph winds in Marion County, caused damages in Hubbard, Scotts Mills, and Salem.
October 1962	Columbus Day Storm. Caused 4 injuries in Silverton, $4 million damages in Salem, and $8 million damages in Marion County as a whole.
December 1951	Winds at 57 mph with gusts measures at 76 mph, caused power outages in Silverton and closed north and south Santiam highways.

Source: Marion County Natural Hazards Mitigation Plan, 2005; National Climatic Data Center.

The Willamette Valley also experiences occasional tornadoes, many of which have produced significant damage and occasional injury or death. Since 1957, Marion County has experienced 5 tornadoes, and several have occurred near Silverton. In October 1998, a small tornado touched down in near Silverton. In November 1997 and November 1991, tornados damaged barns within or near the city of Silverton.

Marion County estimates a high probability that windstorms will occur, and a high vulnerability to windstorm events. Both ratings are true for the city of Silverton as well.

Windstorms can have significant impacts on life and property. Debris carried along by extreme winds can contribute directly to injury and loss of life and indirectly through the failure of protective structures (i.e., buildings) and infrastructure. Windstorms have the ability to cause damage more than 100 miles from the center of storm activity. High winds can topple trees and break limbs which in turn can result in power outages and disrupt telephone, computer, and TV and radio service. Street trees in downtown Silverton are particularly vulnerable to damaging utilities and property. Likewise, Coolidge McClaine Park has many trees that could damage park facilities – including play areas, a kitchen shelter, restroom, and two buildings that house the Art Center and Art Gallery.

In addition to the immediate effects of wind damage, the loss of power due to windstorms can have widespread impacts on business and economic activity. Downed trees can block roads and railways, disrupting access to businesses. Additionally, a sustained loss of power can seriously strain provision of emergency services and the operation of water and sewer facilities and transportation systems.

Please see Marion County's NHMP for a comprehensive description of potential windstorm-related impacts, including the effects that are likely to occur at varying wind speeds.

Severe Winter Storm

The Marion County Natural Hazards Mitigation Plan adequately describes the causes and characteristics of severe winter storms for the entire planning area, including the city of Silverton. Snow and ice are relatively rare in western Oregon, but cold air can occasionally be funneled through the Cascades between the Gorge and Portland. If a Pacific storm happens to reach the area at the same time that the cold air is present, larger than average snow events may result.[xxxvi] Winter storms can happen throughout Marion County, including the city of Silverton, and the extent of the storms will depend upon precipitation levels, temperatures, and the effects of the storm system on the built environment.

Marion County's NHMP accurately describes the history of severe winter storm events for the county as well as Silverton. In addition to the events listed in Marion County's NHMP, two more recent events are noteworthy:

- January-February 2008: Record setting snowstorms in Marion County. State of emergency declared in Marion County and surrounding counties.
- December 2008-2009: Winter storm throughout the Willamette Valley, heavy snow and ice. State of emergency declared in Marion County and surrounding counties.

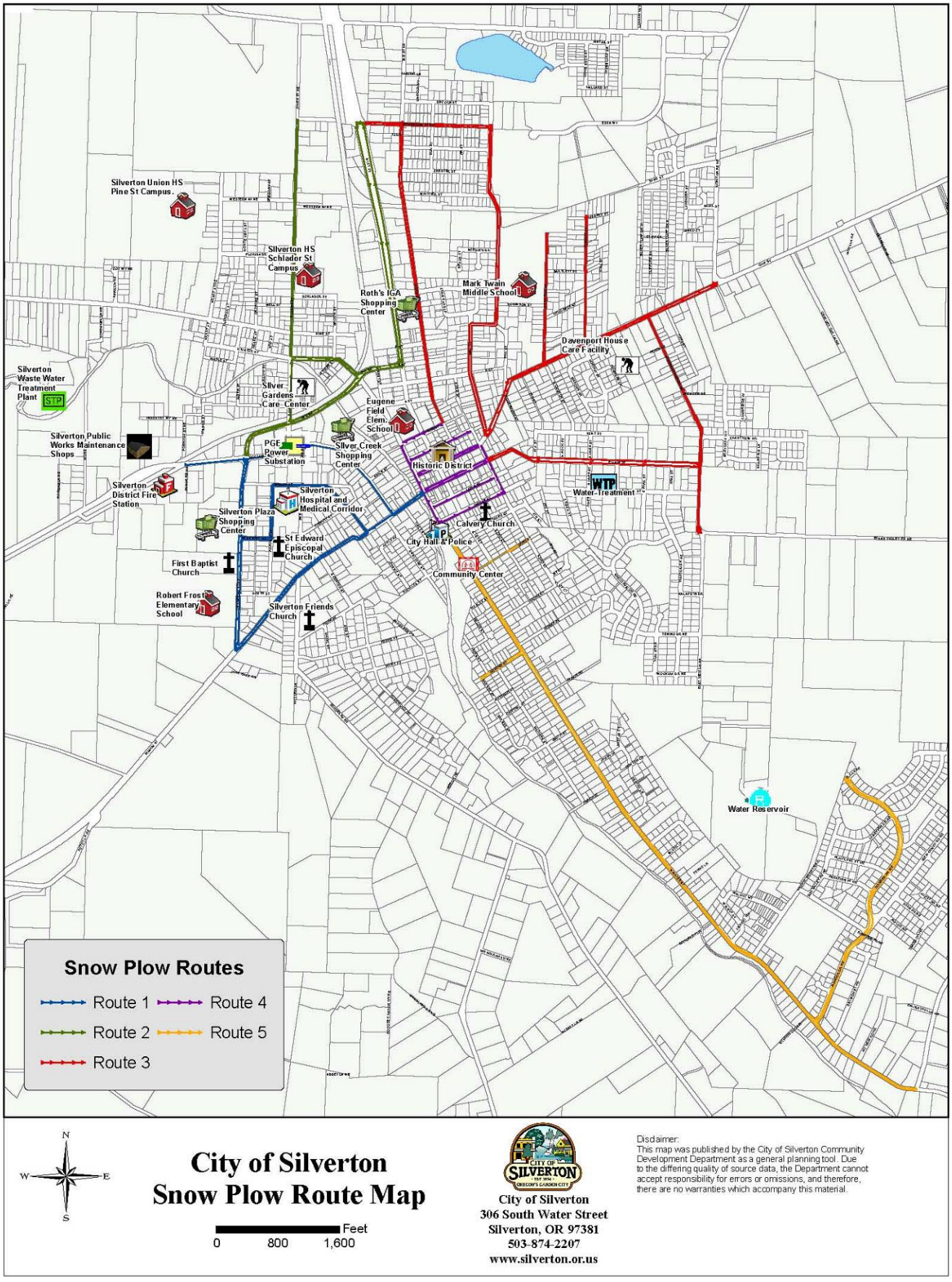
Marion County estimates a high probability that severe winter storms will occur in the future, as well as a high vulnerability to such events. Both ratings are also true for the city of Silverton.

Winter storms can bring snow, ice, and high winds that can cause significant damage to property and people. Downed trees and limbs caused by ice storms can become major hazards for houses, cars, utilities and other property. Residents and visitors are vulnerable to winter storms because icy roads can make it difficult to drive, and prolonged exposure to the cold can cause hypothermia. The temporary loss of home heating can be particularly hard on the elderly, young children, and other vulnerable populations. Icy roads can also limit the mobility of the elderly and very young if they need to be evacuated. Silverton has identified snow plow routes to expedite recovery measures, which can be seen in Figure 16 below.

Severe winter weather can temporarily close key roads and highways, businesses, schools, government offices and other important community services. Long-term closure of Interstate 5 and state highways such as 99E and 214 can be problematic for Silverton's businesses which rely on the city's access to major transportation routes. Retail establishments like those in Silverton's downtown area and in the city's two shopping centers, may be particularly vulnerable if they do not have continuity of operations plans in place. Below freezing temperatures can also lead to breaks in uninsulated water lines. Ice on tree limbs and power lines can cause power failures as well. All of these effects, if they last more than several days, can create significant economic impacts for Silverton as well for the surrounding region.

Finally, the city's water intake and wastewater treatment plants can be damaged by ice and/or below-freezing temperatures. This can lead to limited water intake capabilities and accidental discharge of untreated sewage into Silver Creek. The water intake and wastewater treatment facilities are also subject to flooding if heavy snowmelt occurs. Please see Marion County's NHMP for a more comprehensive description of potential winter storm-related community impacts.

Figure 16 Silverton Snow Plow Routes



Section 4: Mission, Goals, and Action Items

Mission

The mission of Silverton's Addendum is **to create a disaster resilient and sustainable city.** The mission statement was decided by the city's steering committee at the Action Item Development Workshop on June 10th (see Appendix A for details).

Goals

The plan goals help guide the direction of future activities aimed at reducing risk and preventing loss from natural hazards. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items.

The city of Silverton reviewed Marion County's goals on June 10th, 2009 and adopts the county's goals with modification.

Goal #1: PUBLIC AWARENESS

Goal Statement: Increase public awareness of natural hazard risks, emergency notification and response, and resources for citizen preparedness.

Goal #2: EDUCATION

Goal Statement: Educate the public on how to successfully prepare for a natural disaster with minimal property damage and no loss of life.

Goal #3: PREVENTATIVE

Goal Statement: Minimize risks to life, property, historic and cultural assets, public infrastructure and utilities, the environment, and the economy from natural hazards.

Goal #4: FUNDING AND IMPLEMENTATION

Goal Statement: Identify potential funding sources and implement potential mitigation projects.

Goal #5: PARTNERSHIPS AND COORDINATION

Goal Statements:

- Create and enhance partnerships with other stakeholders involved with natural hazard management.
- Coordinate natural hazard mitigation efforts with adjacent jurisdictions and public/private agencies' risk management activities.

Goal #6: NATURAL RESOURCES UTILIZATION

Goal Statement: Promote the use of natural systems and features, watershed planning, and land use planning for natural hazard mitigation whenever possible to reduce long-term costs to the city and maximize effectiveness.

Goal #7: EMERGENCY SERVICES

Goal Statement: Coordinate and integrate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

Mitigation Action Items

Short and long-term action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk.

The following actions were developed by the city's steering committee, with assistance from the Oregon Partnership for Disaster Resilience. The city's steering committee grouped their full list of actions into two categories: those that can (and should) be implemented within the next two years (i.e., until 2012 when the addendum will be updated in conjunction with Marion County's Natural Hazards Mitigation Plan Update), and those that will be held for further consideration at a later date. **Actions that the city believes can be implemented within the next two years are marked with an asterisk (*) below.**

Each action item has a corresponding action item worksheet describing the activity, the project's rationale, potential ideas for implementation, and coordinating / partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. Full action item worksheets are located at the end of the addendum in Appendix D.

Drought

1. Update the current water conservation management plan and educate the public on water supply systems.*

Earthquake

1. Seek voter approval for construction of City of Silverton Police Facility/Emergency Operations Center.*
2. Coordinate with Marion County to assess the seismic stability of the three bridges that cross Silver Creek and seek funding to reinforce or replace as needed (also applies to flooding concerns).*
3. Assess the seismic strength of Silverton's sewage treatment system and develop improvements accordingly as part of the sewage system's current update efforts.

4. Coordinate with Silverton School District to seek funding to assess and seismically retrofit school buildings that are vulnerable to collapse, including Mark Twain Middle School, the Robert Frost Elementary School, and the Eugene Field Elementary School.
5. Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education.
6. Update comprehensive plan to reflect the latest information on seismic hazards.
7. Evaluate the installation of automatic shut-off valves in all city facilities that use natural gas.

Flood

1. Consult with Oregon Emergency Management to develop flood mitigation actions to address flooding hazards along Silver Creek between James Street and C Street.*
2. Develop flood mitigation actions for the waste water treatment facility to prevent damage to the facility and contamination of water resources.
3. Implement the mitigation action items listed in the Silver Creek Dam Emergency Action Plan.*
4. Explore steps needed to qualify Silverton for participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS).
5. Continue compliance with the National Flood Insurance Program (NFIP) through the enforcement of local floodplain ordinances.
6. Update the city's Flood Insurance Rate Maps (FIRMS) if funding becomes available.

Landslide

1. Use newly acquired LIDAR data to determine areas and buildings at risk to landslides and revise comprehensive and land use policies accordingly.*
2. Develop a public infrastructure landslide mitigation program to address the landslide hazard using new LIDAR information obtained from DOGAMI.*
3. Conduct a landslide hazard analysis and risk assessment for the Silverton Reservoir to determine the impacts of a landslide event in the reservoir and needed mitigation measures.

Wildfire

1. Implement the wildfire mitigation actions for Silverton found in the Marion County Community Wildfire Protection Plan.

2. Review Marion County's development codes together with the Marion County Planning Department to develop ways to mitigation wildfires near Silverton.

Windstorm

1. Educate the public about the role of proper tree pruning and stability in preventing damage during windstorms.
2. Continue to support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.
3. Regularly assess the health of trees in Coolidge McClaine Park to prevent damage to buildings and utilities from falling trees.*

Severe Winter Storm

1. Continue to educate citizens about ways to weatherize their homes, as well as safe emergency heating equipment.*

Multi-Hazard

1. Seek funding for the construction of a new City Hall facility that is outside the flood inundation zone and that is earthquake resistant.
2. Create a Facilities Master Plan that assesses the need for new or updated facilities, and incorporates natural hazard vulnerabilities and mitigation measures for reducing vulnerability.
3. Establish mutual aid agreements between government agencies and commercial businesses in the event of an emergency (e. g. fuel, heavy equipment, food, etc.).
4. Educate businesses and governmental organizations about the importance of continuity of operations plans to make them more resilient to natural hazards.
5. Coordinate efforts with the Red Cross to review and assess potential safety zones/shelter sites.
6. Encourage the development of VOAD (Voluntary Organizations Assisting in a Disaster) to ease the load on emergency services following a disaster.
7. Purchase and place automatic external defibrillators (AED's).
8. Improve coordination and evaluation of technical and engineering gaps in communications capabilities for natural hazards event response.
9. Encourage citizens to prepare and maintain 72 hour kits.*
10. Review, and if necessary, revise emergency management and business continuity plans, policies, and ordinances to ensure effective response, business continuity, and post-disaster recovery efforts.

Note: Due to Silverton's isolation from volcano risk areas, Silverton's steering committee believes that implementing volcano-related mitigation actions would not be cost-effective at this time. As such, the city has not identified volcano mitigation action items. Silverton will partner with Marion County, however, on the implementation of mitigation strategies that benefit both jurisdictions.

Section 5: Plan Implementation and Maintenance

This section details the formal process that will ensure that Silverton's Addendum to the Marion County Natural Hazards Mitigation Plan remains an active and relevant document. The plan implementation and maintenance process includes a schedule for monitoring and evaluating the plan annually, as well as producing an updated plan every five years. Because this addendum lives within the Marion County Natural Hazard Mitigation Plan, the city will coordinate with the county's five-year plan update schedule.

Finally, this section describes how the city will integrate public participation throughout the plan maintenance and implementation process.

Plan Adoption

After the addendum is locally reviewed and deemed complete, the city manager submits it to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management submits the plan to the Federal Emergency Management Agency (FEMA--Region X) for review. This review addresses the federal criteria outlined in the FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, the city will adopt the plan via resolution. At that point the city will gain eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds.

The City Council will be responsible for adopting the city of Silverton's Natural Hazard Mitigation Plan Addendum. This governing body has the authority to promote sound public policy regarding natural hazards.

Convener

On July 29th, 2009, Silverton's steering committee identified the city manager as the convener for Silverton's Addendum to the Marion County Natural Hazards Mitigation Plan. The convener's responsibilities include:

- Coordinating future meeting dates, times, locations, agendas, and member notification;
- Documenting the discussions and outcomes of future coordinating body meetings;
- Serving as a communication conduit between the coordinating body and the public / stakeholders;

- Identifying emergency management-related funding sources for natural hazards mitigation projects;
- Coordinating plan update processes;
- Submitting future plan updates to Oregon Emergency Management for review; and
- Coordinating local adoption processes.

Coordinating Body

On July 29th, 2009, Silverton's steering committee identified the following persons to serve as the future coordinating body for Silverton's Addendum to the Marion County Natural Hazards Mitigation Plan:

- Bryan Cosgrove, Silverton City Manager
- Rick Lewis, Silverton Police Department
- Steve Kay, Silverton Community Development Department
- Ed Grambusch, Silverton Fire Department
- Darrel Mathews, Silverton Local Business Representative
- Genie Stoll, Silverton Local Business Representative
- Doreen Kelly, Community Nonprofit
- Rob Charles, Public Works Director

The coordinating body's roles and responsibilities include:

- Attending future plan maintenance and plan update meetings;
- Serving as the local evaluation committee for funding programs like the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program, and the Flood Mitigation Assistance Program;
- Prioritizing and recommending funding for natural hazard risk reduction projects;
- Annually assessing the list of mitigation actions (i.e., determining new actions, removing actions that are no longer relevant, etc.);
- Updating the natural hazards mitigation plan in accordance with the county's five-year plan update schedule;
- Developing and coordinating ad hoc and/or standing subcommittees as needed; and
- Coordinating public involvement activities.

To make the coordination and review of the Silverton Addendum as broad and useful as possible, the coordinating body will engage additional stakeholders and other relevant hazard mitigation organizations and agencies to implement the identified action items. Specific organizations have been identified as either internal or external partners on the individual action item forms in Appendix D. Likewise, any coordinating

organizations that are not part of the coordinating body will be invited to attend future meetings as well.

The city of Silverton is currently participating in a regional Emergency Management Advisory Committee (EMAC). The EMAC may transition to a Local Emergency Planning Committee (LEPC) in the near future. Because most of Silverton's coordinating body members participants in the EMAC, the coordinating body's activities may become integrated with EMAC (or LEPC) meetings in the future as well.

Plan Maintenance

Plan maintenance is a critical component of the natural hazard mitigation plan. Proper maintenance of the plan ensures that this plan will maximize the city's efforts to reduce the risks posed by natural hazards. This section includes a process to ensure that a regular review and update of the plan occurs. The convener and coordinating body are responsible for implementing this process, in addition to maintaining and updating the plan through a series of meetings outlined in the maintenance schedule below.

Semi-Annual Meetings

Following plan adoption, the coordinating body will meet quarterly for one year, and then semi-annually thereafter. The coordinating body will draw from the following agenda items when developing future meeting topics:

- Discuss available (or soon-to-be available) funding streams, including general funds, and identify eligible mitigation actions.
- Identify creative strategies for the implementation of mitigation actions that are not eligible for federal funding.
- Identify opportunities to incorporate mitigation actions into existing plans or policies (i.e., the Comprehensive Plan is scheduled to be updated between 2009 and 2011; the Transportation Plan will be updated around 2014, and mitigation actions can be added at any time to the Capital Improvements Plan).
- Determine whether there are components of the plan's Risk Assessment that can be updated. For example, discuss and document any natural disasters (or significant hazard events) that have occurred between meetings. Or, further refine the risk assessment (i.e., conduct further studies when possible and/or acquire and integrate new data into the plan).
- Discuss methods for continued public involvement, and/or document public involvement efforts.
- Update the community profile's census data following the 2010 census.

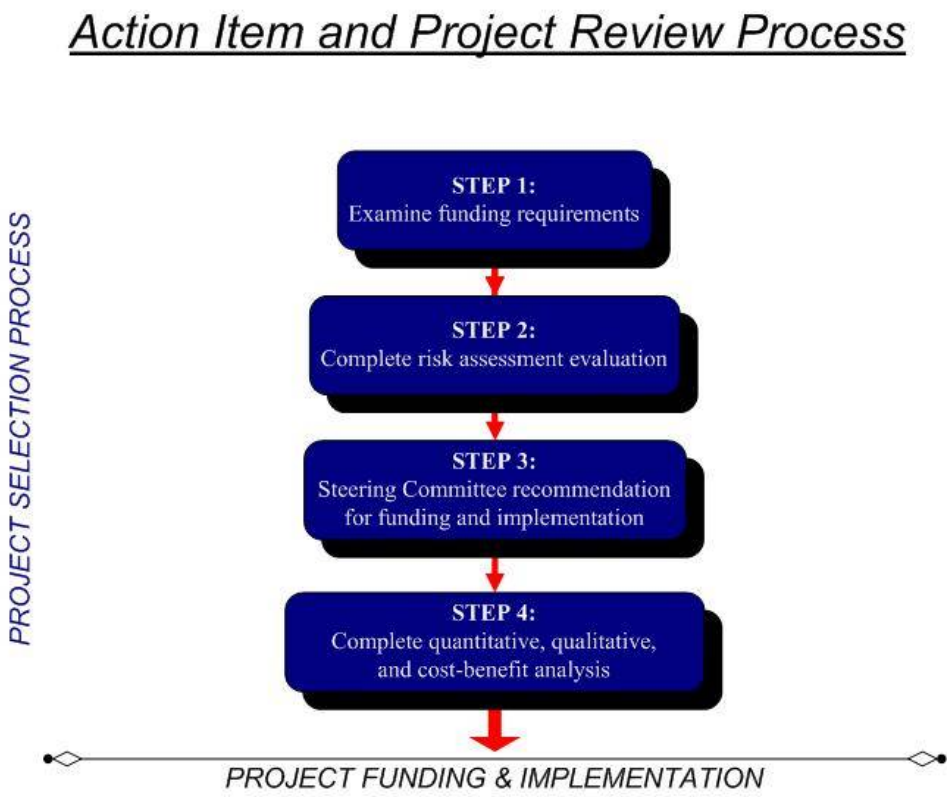
- Annually review the plan's action items, and discuss whether new actions should be listed, or whether existing actions should be removed.
- Discuss and document any mitigation-related activities that have occurred in the community. Likewise, document successes and lessons learned.

The convener will be responsible for documenting the outcome of all coordinating body meetings. The process the coordinating body will use to prioritize mitigation projects is detailed in the section below. The plan's format allows the city to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a natural hazards mitigation plan that remains current and relevant to the participating jurisdictions.

Project Prioritization Process

The Disaster Mitigation Act of 2000 (via the Pre-Disaster Mitigation Program) requires that jurisdictions identify a process for prioritizing potential actions. Potential mitigation activities often come from a variety of sources; therefore the project prioritization process needs to be flexible. Projects may be identified by coordinating body members, local government staff, other planning documents, or the risk assessment. Figure 17 illustrates the project prioritization process.

Figure 17: Project Prioritization Process



Source: Community Service Center's Partnership for Disaster Resilience at the University of Oregon, 2008.

Step 1: Examine funding requirements

The first step in prioritizing the plan's action items is to determine which funding sources are open for application. Several funding sources may be appropriate for the city's proposed mitigation projects. Examples of mitigation funding sources include but are not limited to: FEMA's Pre-Disaster Mitigation competitive grant program (PDM), Flood Mitigation Assistance (FMA) program, Hazard Mitigation Grant Program (HMGP), National Fire Plan (NFP), Community Development Block Grants (CDBG), local general funds, and private foundations, among others. Please see Appendix B for a more comprehensive list of potential grant programs.

Because grant programs open and close on differing schedules, the coordinating body will examine upcoming funding streams' requirements to determine which mitigation activities would be eligible. The coordinating body may consult with the funding entity, Oregon Emergency Management, or other appropriate state or regional organizations about project eligibility requirements. This examination of funding sources and requirements will happen during the coordinating body's semi-annual plan maintenance meetings.

Step 2: Complete risk assessment evaluation

The second step in prioritizing the plan's action items is to examine which hazards the selected actions are associated with and where these hazards rank in terms of community risk. The coordinating body will determine whether or not the plan's risk assessment supports the implementation of eligible mitigation activities. This determination will be based on the location of the potential activities, their proximity to known hazard areas, and whether community assets are at risk. The coordinating body will additionally consider whether the selected actions mitigate hazards that are likely to occur in the future, or are likely to result in severe / catastrophic damages.

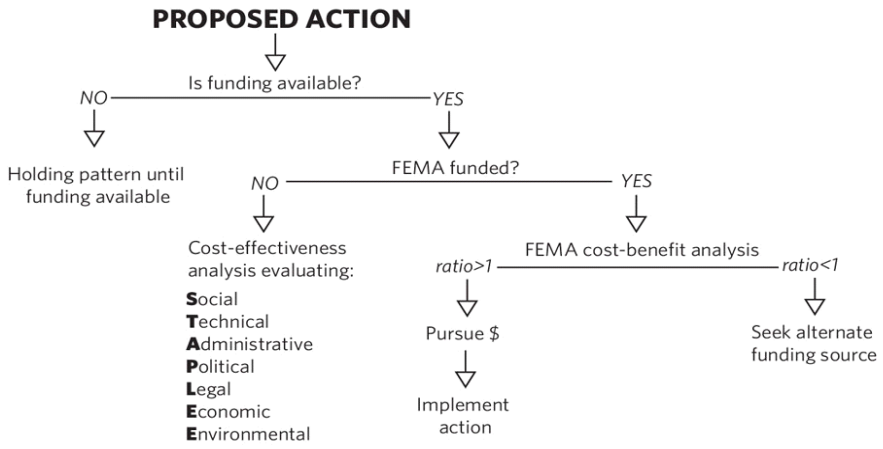
Step 3: Coordinating body recommendation

Based on the steps above, the coordinating body will recommend which mitigation activities should be moved forward. If the coordinating body decides to move forward with an action, the coordinating organization designated on the action item form will be responsible for taking further action and, if applicable, documenting success upon project completion. The coordinating body will convene a meeting to review the issues surrounding grant applications and to share knowledge and/or resources. This process will afford greater coordination and less competition for limited funds.

Step 4: Complete quantitative and qualitative assessment, and economic analysis

The fourth step is to identify the costs and benefits associated with the selected natural hazard mitigation strategies, measures or projects. Two categories of analysis that are used in this step are: (1) benefit/cost analysis, and (2) cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity assists in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Figure 18 shows decision criteria for selecting the appropriate method of analysis.

Figure 18: Benefit Cost Decision Criteria



Source: Community Service Center's Partnership for Disaster Resilience at the University of Oregon, 2006.

If the activity requires federal funding for a structural project, the coordinating body will use a Federal Emergency Management Agency-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit/cost ratio of greater than one in order to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project's cost effectiveness. The coordinating body will use a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project's qualitative cost effectiveness. The STAPLE/E technique has been tailored for use in natural hazard action item prioritization by the Partnership for Disaster Resilience at the University of Oregon's Community Service Center. See Appendix C for a description of the STAPLE/E evaluation methodology.

Implementation through Existing Programs

The city of Silverton currently addresses statewide planning goals and legislative requirements through its comprehensive land use plan, development code, transportation system plan, park and recreation master plan, wastewater system facility plan, emergency operations plan, and downtown master plan. To the extent possible, Silverton will work to incorporate the recommended mitigation action items into existing plans, programs and policies. Silverton periodically updates its land use, comprehensive and strategic plans and policies. Implementing the Natural Hazards Mitigation Plan Addendum's actions items through existing plans, programs and policies increases the likelihood of action items being supported and increases the likelihood that the plan gets updated to remain current and efficiently utilize the county's existing resources.

Where possible, opportunities for cross-plan implementation are noted in the full action item worksheets in Appendix D.

Continued Public Involvement & Participation

The city of Silverton is dedicated to involving the public directly in the continual reshaping and updating of the Silverton's Natural Hazard Mitigation Plan Addendum. Although members of the coordinating body represent the public to some extent, the public will also have the opportunity to continue to provide feedback about the plan.

To ensure continued public involvement and participation in the city's plan update processes, the city of Silverton will do the following:

- The city will issue press releases that detail and/or describe significant revisions to the plan. The press releases will request public feedback, if needed.
- The coordinating body will plan to conduct stakeholder interviews during five-year plan update processes. Likewise, if any significant plan changes occur between updates, stakeholder input will be requested then as well.

Additionally, the Partnership, with a commitment from the Institute for Business & Home Safety (IBHS) will provide individuals in the region with access to, and use of, the IBHS interactive, web-based *Open for Business* property protection and disaster recovery planning tool. The purpose of the planning tool is to: (1) create understanding of the importance of disaster planning; (2) teach local businesses how to navigate the interactive, web-based *Open for Business* property protection and disaster recovery planning tool; (3) assist small businesses in developing their own plans during the training; and (4) teach businesses how to communicate the importance of developing and utilizing plans for property protection and recovery from business interruption. An Open for Business workshop will be held in Marion County in October, 2009.

Lastly, the city's natural hazard mitigation plan addendum has been archived and posted on the University of Oregon Libraries' Scholar's Bank Digital Archive. The city's website includes a link to this website, and contact information is included in the plan in order to facilitate public comment.

Five-Year Review of Plan

This plan will be updated every five years in conjunction with the Marion County Natural Hazard Mitigation Plan. The following 'toolkit' can assist the convener in determining what plan update activities need to occur. Likewise, the toolkit can assist the convener in determining which plan update activities can be discussed during regularly-scheduled plan maintenance meetings, and which activities require additional meeting time and/or the formation of sub-committees.

Mitigation Plan Update Toolkit			
Question	*Yes*	*No*	*Plan Update Action*
Is the planning process description still relevant?			Modify this section to include a description of the plan update process. Document how the planning team reviewed and analyzed each section of the plan, and whether each section was revised as part of the update process. (This toolkit will help you do that).
Do you have a public involvement strategy for the plan update process?			Decide how the public will be involved in the plan update process. Allow the public an opportunity to comment on the plan process and prior to plan approval.
Have public involvement activities taken place since the plan was adopted?			Document activities in the "planning process" section of the plan update
Are there new hazards that should be addressed?			Add new hazards to the risk assessment section
Have there been hazard events in the community since the plan was adopted?			Document hazard history in the risk assessment section
Have new studies or previous events identified changes in any hazard's location or extent?			Document changes in location and extent in the risk assessment section
Has vulnerability to any hazard changed?			Document changes in vulnerability in the risk assessment section
Have development patterns changed? Is there more development in hazard prone areas?			
Do future annexations include hazard prone areas?			
Are there new high risk populations?			
Are there completed mitigation actions that have decreased overall vulnerability?			

Mitigation Plan Update Toolkit			
Question	*Yes*	*No*	*Plan Update Action*
Did the plan document and/or address National Flood Insurance Program repetitive flood loss properties?			Document any changes to flood loss property status
Did the plan identify the number and type of existing and future buildings, infrastructure, and critical facilities in hazards areas?			1) Update existing data in risk assessment section or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Did the plan identify data limitations?			If yes, the plan update must address them: either state how deficiencies were overcome or why they couldn't be addressed
Did the plan identify potential dollar losses for vulnerable structures?			1) Update existing data in risk assessment section or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Are the plan goals still relevant?			Document any updates in the plan goal section
What is the status of each mitigation action?			Document whether each action is completed or pending. For those that remain pending explain why. For completed actions, provide a 'success' story.
Are there new actions that should be added?			Add new actions to the plan. Make sure that the mitigation plan includes actions that reduce the effects of hazards on both new and existing buildings.
Is there an action dealing with continued compliance with the National Flood Insurance Program?			If not, add this action to meet minimum NFIP planning requirements
Are changes to the action item prioritization, implementation, and/or administration processes needed?			Document these changes in the plan implementation and maintenance section
Do you need to make any changes to the plan maintenance schedule?			Document these changes in the plan implementation and maintenance section
Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?			If the community has not made progress on process of implementing mitigation into existing mechanisms, further refine the process and document in the plan.

[i] Source: USGS - Partnership for Disaster Resilience Research Collaborative, 2006.

[ii] Western Regional Climate Center, "Silverton Oregon," http://www.wrcc.dri.edu/summary/Climsmor.html, accessed March 30, 2009.

[iii] Ibid.

[iv] Portland State University: Population Research Center, *2007 Oregon Population Report*, http://www.pdx.edu/prc/annualorpopulation.html, (March 2008), 12.

[v] US Census Bureau, "Profile of Selected Social Characteristics, 2000, Silverton City, OR," American Factfinder Quick Tables, www.census.gov.

[vi] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Silverton City, OR," American Factfinder Quick Tables, www.census.gov.

[vii] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Silverton City, OR," American Factfinder Quick Tables, www.census.gov.

[viii] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Silverton City, OR," American Factfinder Quick Tables, www.census.gov.

[ix] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Silverton City; Marion County, OR," American Factfinder Quick Tables, www.census.gov.

[x] US Census Burean, "Profile of General Demographic Characteristics, 2000, Silverton City, OR," American Factfinder Quick Tables, www.census.gov.

[xi] Ibid.

[xii] Morrow, 1999; Burby and others, 2003.

[xiii] Burby and others, 2003.

[xiv] US Census Bureau, "Profile of Selected Housing Characteristics, 2000, Silverton City, OR," American Factfinder Quick Tables, www.census.gov.

[xv] Ibid.

[xvi] City of Silverton, through email correspondence with Steve Kay, Silverton Community Development Director, March 13, 2009.

[xvii] Ibid.

[xviii] Comprehensive Plan, 6-7.

[xix] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Aurora City, OR," American Factfinder Quick Tables, www.census.gov.

[xx] Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.*

xxi Source: USGS - Partnership for Disaster Resilience Research Collaborative, 2006.

[xxii] Western Regional Climate Center, "Silverton Oregon," http://www.wrcc.dri.edu/summary/Climsmor.html, accessed March 30, 2009.

[xxiii] NOAA, 1993. Tsunamis affecting the West Coast of the United States: 1806-1992.

[xxiv] McConnell, Vicki S. Department of Geology and Mineral Industries. *Statewide Seismic Needs Assessment: Implementation of Oregon 2005 Senate Bill 2 Relating to Public Safety, Earthquakes, and Seismic Rehabilitation of Public Buildings."* 2007. http://www.oregongeology.com/sub/projects/rvs/OFR-O07-02-SNAA-onscreen.pdf.

[xxv] See p. 6-6 to 6-10 of the Marion County Natural Hazards Mitigation Plan for an overview of the causes and characteristics.

[xxvi] City of Silverton Municipal Code, Section 2.5.210. http://www.codepublishing.com/or/silverton.html

[xxvii] McGuire, L., Ford, E., and Okoro, C., 2007, Natural disasters and older US adults with disabilities—implications for evacuation: Disasters, v. 31, no. 1, p. 49–56.

[xxviii] Morrow, B., 1999, Identifying and mapping community vulnerability: Disasters, v. 23, no. 1, p. 1–18; Ngo, E., 2003, When disasters and age collide reviewing vulnerability of the elderly: Natural Hazards Review, v. 2, no. 2, p. 80–89.

[xxix] Marion County Natural Hazards Mitigation Plan, Landslide Chapter.

[xxx] Marion County Natural Hazards Mitigation Plan, Volcanic Eruptions Chapter.

[xxxi] United States Geological Survey, Cascades Volcano Observatory. Vancouver, Washington. http://vulcan.wr.usgs.gov/

[xxxii] United States Geological Survey, Cascades Volcano Observatory. Vancouver, Washington. http://vulcan.wr.usgs.gov/

[xxxiii] Marion County Natural Hazards Mitigation Plan, Wildfire Chapter.

[xxxiv] Marion County Community Wildfire Protection Plan (CWPP), Appendix C.

[xxxv] Marion County Community Wildfire Protection Plan (CWPP), Appendix C.

[xxxvi] Marion County Natural Hazards Mitigation Plan, Severe Winter Storm Chapter.

Appendix A: Planning and Public Process

The following appendix documents Silverton's natural hazards mitigation planning and public involvement processes.

Work Sessions

Informational Meeting Agenda A2
Kickoff Meeting Agenda A3
Kickoff Meeting Sign-In A4
Kickoff Meeting Materials A6
Risk Assessment Meeting Agenda A19
Risk Assessment Meeting Sign-In A20
Marion County Hazard Analysis A25
Goals & Action Item Meeting Agenda A26
Goals & Action Item Meeting Sign-In A27
Goals & Action Item Meeting Materials A30
Plan Implementation & Maintenance Meeting Agenda A35
Plan Implementation & Maintenance Meeting Sign-In A36
Plan Implementation & Maintenance Meeting Materials A38

Public Outreach

Statesman Journal Article A47
Stakeholder Interview Questions A48
Stakeholders Contacted A50
Stakeholder Survey Results A54

Meeting: Region 3 City Mitigation Plans
Date: September 16, 2008
Time: 10:00 am – 12:00 pm
Location: Marion County Public Works

AGENDA

1. Welcome & Introductions (***5 minutes***)
   - Krista Dillon, OPDR
2. Partnership Overview (***20 minutes***)
   - Krista Dillon
3. Pre-Disaster Mitigation Planning Grant (***15 minutes***)
   - Krista Dillon
4. City Mitigation Planning Process & Timeline (***30 minutes***)
   - Megan Findley, OPDR
5. Next Steps (***20 minutes***)
   - Krista Dillon
6. Questions??? (***20 minutes***)

Oregon Partnership for Disaster Resilience
Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.3588 • Fax: 541.346.2040

Meeting: Region 3 Cities Kickoff
Date: February 25, 2009
Time: 2:00 pm – 5:00 pm
Location: Marion County Public Works Building, 5155 Silverton Rd NE, Salem, OR

AGENDA

1. Welcome & Introductions ***(20 minutes)***
   - *Megan Findley*

2. OPDR Overview ***(40 minutes)***
   - *Andre LeDuc*

3. Pre-Disaster Mitigation Program Overview ***(30 minutes)***
   - Megan Findley

Break (15 minutes)

4. 4-Phased Planning Process ***(45 minutes)***
   - Steering Committee & Stakeholder Selection Exercise
     - *Gregoor Passchier*

5. Public Involvement Opportunities Discussion ***(30 minutes)***
   - *Megan Findley*

6. Admin & Next Steps ***(15 minutes)***
   - *Megan Findley & Gregoor Passchier*

Oregon Partnership for Disaster Resilience
Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.2305 • Fax: 541.346.2040

Meeting Sign-In

Region 3 Cities 'Kickoff' Work Session. February 25th, 2009; 2-5pm
Marion County Public Works Building. Courthouse Square 555 Court Street N.E, Salem, OR.

Name	Representing	Email	Roundtrip mileage (if applicable)
Rich Barstad	City of Silverton - PW	rbarstad@silverton.or.us	
DARREL MATHEWS	CITY OF SILVERTON, SDF	bangsandburns@pngusa.net	
Rick Lewis	City of Silverton - PD	rlewis@Silverton.or.us	
John VANDERZANDEN	Marion County EM	JVanderzanden@co.marion.OR.US	
DAN BROWN	CITY OF WOODBURN	DAN.BROWN@CI.WOODBURN.OR.US	
NATALIE LABOSSIERE	City of Woodbuen	natalie.labossiere@ci.woodburn.or.us	
laurie Boyce	City of Aurora	recorder@ci.aurora.or.us	
Carrie Brennecke	City of Woodburn	carrie.brennecke@ci.woodburn.or.us	

Name	Representing	Email	Roundtrip mileage (if applicable)
Krista Rowland	Marion County Emergency Mgmt	krowland@co.marion.or.us	
Julie Amicci	Tigard PETS PET EMERGENCY PROGRAM	Juliepdx@hotmail.com	
Kevin Watson	City of Keizer	watsonk@keizer.org	

Memo

To: Cities Developing Mitigation Plan Addenda (Keizer, Woodburn, Aurora, Silverton)

From: Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center

Date: February 25, 2009

Re: **Natural Hazards Mitigation Plans- Developing a City Addendum**

Purpose

The purpose of this memo is to inform communities about the process for developing a city addendum to their county's natural hazards mitigation plan. This memo outlines the federal requirements for city addenda and summarizes the planning process cities will follow in developing their addenda. The planning process includes: 1) developing a steering committee of local constituents to guide the planning process; 2) conducting an issue identification and hazard identification workshop to determine the city's vulnerability to natural hazards; and 3) developing action items to reduce the impact of natural hazard events.

City Specific Addendum and Multi-jurisdictional Planning Requirements

A natural hazards mitigation plan identifies long and short-term strategies that can permanently reduce or alleviate the loss of life, property, and injuries resulting from natural hazards. A FEMA-approved natural hazards mitigation plan gives a jurisdiction access to three types of grant funding: the Pre-Disaster Mitigation Grant Program (PDM); the Hazard Mitigation Grant Program (HMGP); and the Flood Mitigation Assistance Grant Program (FMA). [1] Without a FEMA-approved natural hazards mitigation plan, a jurisdiction is *not* eligible to apply for these federal mitigation grant funds.

In order to access the federal mitigation grants described above, a city may either: 1) create a stand-alone natural hazards mitigation plan that is not tied to the county's plan; or 2) create an addendum to the county's plan. As outlined by the Disaster Mitigation Action of 2000 (DMA2K), a stand-alone plan must meet 20 FEMA requirements whereas an addendum must meet 4.[2] Creating an addendum is a much simpler process than creating a stand-alone plan. City addendum requirements are as follows:

1. Multi-jurisdictional Participation - ***§201.6(a)(3)*** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process*
    a. Does the plan identify how each jurisdiction participated in the plan's development?

2. Multi-jurisdictional Risk Assessment - ***§201.6(c)(2) (iii):*** *For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*
    a. Does the plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?

[1] Eligibility for FMA funds is dependent on the plan meeting several flood specific planning requirements.
[2] Cities only need to meet 4 requirements if the county's plan meets the remaining 16 on the city's behalf.

3. Multi-jurisdictional Mitigation Strategy - ***§201.6(c)(3) (iv)****: For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*
    a. Does the plan include separate, identifiable action items for each jurisdiction requesting FEMA approval of the plan?

4. Multi-jurisdictional Plan Adoption - ***§201.6(c)(5)*** *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan* ***must*** *document that it has been formally adopted.*
    a. Does the plan indicate the specific jurisdictions represented in the plan?
    b. For each jurisdiction, has the local governing body approved the plan?
    c. Are supporting documents, such as resolutions, included?

Planning Process

In an effort to assist each city in their addendum development process, the Oregon Partnership for Disaster Resilience (OPDR) will facilitate a series of four work-sessions. OPDR will be responsible for developing city addenda based on input from each work session. City representatives must attend work sessions in order to facilitate the plan development process.

Although work-sessions will have a strong information-gathering component, they will also be treated as opportunities to train communities in the plan development process. OPDR's intention with the work sessions is therefore twofold; in addition to developing effective and purposeful mitigation plans for each participating community, the Partnership will equip communities the tools and resources necessary for maintaining, implementing, and updating their plans in accordance with the Disaster Mitigation Act of 2000.

The following 'steps' outline the planning process that will occur between February 2009 and September 2009.

Step 1: Getting Started

OPDR will develop and facilitate a 'kick-off' work session with communities on February 25th, 2009. Meeting topics will include an overview of OPDR's programs and activities; a discussion of mitigation planning requirements; and exercises in identifying stakeholders, potential steering committee members, and public involvement strategies. Following the work session, cities will be asked to develop a steering committee that's composed of members from various sectors of the community. Steering committee members often include representatives from the city, such as public works staff, planners, and local emergency managers; representatives from the business community; representatives of neighborhood organizations that could be affected by natural hazards; and other concerned citizens. Steering committees for city addenda range from 4 to 8 members, but it is up to the community to decide the total number of committee members and who would be most knowledgeable about natural hazard events. Each city should additionally identify a 'point of contact' that can identify and invite committee members to the table.

All steering committee members should be prepared to attend 3 meetings between April and August, 2009. At each meeting, committee members should be able to provide OPDR with local knowledge about community processes, risks, and hazards. Additionally, the committee will be asked to review plan drafts, and to document the time they spend developing the plan (since the grant that funds this effort requires local in-kind match.) Lastly, a representative from the city's steering committee should inform the city's local governing body (i.e. city council) about the work the steering committee is doing to keep them informed of the planning process.

Following the first work session, OPDR will conduct interviews with stakeholders from each community. Interviews will serve as a public outreach component for the cities' planning processes, in the hopes that greater outreach will better inform each city's risk assessment and natural hazard mitigation strategies.

Step 2: Assessing Local Risks

A central component to any natural hazards mitigation plan is the risk assessment. OPDR will develop and facilitate a risk assessment workshop on April 15 in partnership with the U.S. Geological Survey and Oregon Emergency Management. Each city's full steering committee must be present at this workshop, which will last from 9am-5pm. Cities will be asked to review their county's mitigation plan, and to describe how the city's risks

are greater than (or simply differ from) the county's. Information gathered from these workshops will assist the city in developing mitigation, or risk reduction strategies.

Step 3: Developing City-Specific Action Items

Based on information gathered at the April risk assessment workshop, and information gathered from stakeholder interviews, OPDR will develop a set of proposed mitigation strategies (or 'action items') for each city. Action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk. Example actions include policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Steering committee members will be contacted for input in drafting actions as well.

In June (date TBD), steering committees will convene for an 'Action Item' workshop with OPDR. Steering committees will discuss OPDR's proposed mitigation strategies, and will develop a final set of actions for their city addenda.

Step 4: Adopting, Implementing, and Maintaining the Plan

In July (date TBD), OPDR will host a final work session to discuss strategies for implementing, maintaining, and updating the plan. Additionally, ODPR will be responsible for drafting a final addendum for each city. Committee members will be expected to review OPDR's final drafts, and provide comments and edits on the final document. On behalf of each city, OPDR will send final drafts to Oregon Emergency Management and FEMA for review.

FEMA review can take up to 45 business days. The plan will either be approved pending adoption, or require additional revisions, and OPDR will work with each city to identify how to meet the required revisions (if needed). If the city addendum is approved pending adoption, the city will need to adopt the plan via resolution. OPDR will support each city throughout the review process, and will provide the city with guidance and materials to begin the local adoption process.

Once approved at the local level, OPDR will send proof of local adoption to FEMA. FEMA will then send a final approval letter to Oregon Emergency Management and OPDR, who will then send the final letter to the city. The final approval letter acknowledges the community's eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program, and the Flood Mitigation Assistance Grant Program.

Note: The approval letter will show that the city's addendum needs to be updated along with the county's plan by December, 2010.

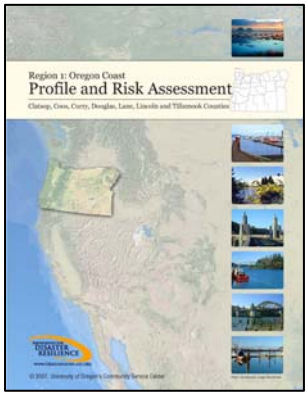
For more information, please contact Megan Findley, OPDR *Pre-Disaster Mitigation Program Manager*, at 541.346.2305 or mfindley@uoregon.edu.

Hazard Resources

The following resources can help you locate information regarding natural hazards that may impact your community.

All Hazards

- State of Oregon Enhanced Natural Hazard Mitigation Plan
  The State plan organizes the state into eight regions and it includes a Natural Hazard Risk Profile specific to each region. One component of the regional profile is the Natural Hazard Risk Assessments. The Hazard Risk Assessments provides the following information for each natural hazard: characteristics and a brief history, recurrence, and vulnerability. The State's Regional Natural Hazard Risk Assessments are a good starting place for identifying and profiling the hazards that are relevant to your community's risk assessment. The Regional Risk Assessments are available on the Partnership webpage (www.oregonshowcase.org).



- Hazard Analysis Matrix
  Each county in Oregon has developed and is required to maintain a hazard analysis that includes risk scores for the hazards they face. These scores range from 24 (low) to 240 (high), and reflect the county's analysis for each particular hazard. By using this methodology consistently throughout the state one can compare the risk posed by a particular hazard from one county to the next, and each local jurisdiction can compare one hazard against others to establish priorities for planning, hazard mitigation, and capability development. Contact a County Emergency Manager to receive a copy of this document.

SAMPLE HAZARD ANALYSIS MATRIX

Hazards		History WF = 2	Vulnerability WF = 5	Maximum Threat WF = 10	Probability WF = 7	Total Score
FLOOD	WF X SR	2 X 10	5 X 9	10 X 7	7 X 10	205
	Subscore	= 20	= 45	= 70	= 70	
WILDFIRE	WF X SR	2 X 10	5 X 8	10 X 5	7 X 10	180
	Subscore	= 20	= 40	= 50	= 70	
EARTHQUAKE	WF X SR	2 X 2	5 X 10	10 X 10	7 X 3	175
	Subscore	= 4	= 50	= 100	= 21	
WINDSTORM	WF X SR	2 X 8	5 X 6	10 X 6	7 X 8	162
	Subscore	= 16	= 30	= 60	= 56	
HAZMAT	WF X SR	2 X 7	5 X 5	10 X 6	7 X 6	141
	Subscore	= 14	= 25	= 60	= 42	
LANDSLIDE	WF X SR	2 X 10	5 X 4	10 X 3	7 X 9	133
	Subscore	= 20	= 20	= 30	= 63	
DAM FAILURE	WF X SR	2 X 1	5 X 5	10 X 2	7 X 2	61
	Subscore	= 2	= 25	= 20	= 14	

- Technical Resource Guide
  The Technical Resource Guide was developed by the Oregon Partnership for Disaster Resistance, with the assistance of the DLCD. The resource guide is a tool that can assist Oregon cities and counties in planning for, and limiting the effects of, threats posed by natural hazards. The TRG is available online at http://www.oregonshowcase.org/downloads/pdf/projects/UO-ONHW_Hazard_TRG_full_1999.pdf.

- Oregon's Regional Hazard Viewer:
  http://mtjune.uoregon.edu/website/hazardmaps/webapp/hazardsViewer_content.html
  The interactive viewer visually displays perceived vulnerability per hazard for each county in Oregon, which allows communities and the state to compare the vulnerability of hazards across regions.

- Newspapers
  Local news stories often provide details on where and how past hazard events have impacted the community.

- Local Historical Society
  A visit to the local historical society can assist you in gathering hazard history data. Oftentimes, historical societies maintain information about past hazard events.

- DLCD Natural Hazard Minisite:
  http://www.lcd.state.or.us/LCD/HAZ/index.shtml

- Hazard Maps
  All communities have Flood Insurance Rate Maps (FIRMs) that detail where the floodplain is. Your community may also have other localized hazard maps (e.g. slope/landslide risk). These maps highlight the areas within the community that are most at risk from a hazard event.

- FEMA
  - Federal Disaster Declarations: http://www.fema.gov/news/disasters.fema. Search for declared disasters by year and/or state.
  - Mapping information:
    https://hazards.fema.gov/femaportal/wps/portal/!ut/p/.cmd/cs/.ce/7_0_A/.s/7_0_CM9/_s.7_0_A/7_0_CM9
  - Types of Disasters (hazard descriptions):
    http://www.fema.gov/hazard/types.shtm
  - HAZUS: http://www.fema.gov/plan/prevent/hazus/. HAZUS-MH is a powerful risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest geographic information systems (GIS) technology to produce estimates of hazard-related damage before, or after, a disaster occurs.

- National Climatic Data Center: http://www.ncdc.noaa.gov. NCDC is the world's largest active archive of weather data. Under "Data and Products: Free Data," you can access climate maps, storm data, wind data, historic significant events, and freeze/frost data. Most links will open a PDF document; you will need to search (Control: F) for "Oregon" to find locally-relevant information.

Base Maps

- Oregon Coastal Atlas: www.coastalatlas.net. Click on the 'maps' toolbar to create a map of your community. Explore the "tools" and "learn" tabs for additional information.
- Oregon Department of Transportation: http://www.oregon.gov/ODOT/maps.shtml
- U.S. Geological Survey:
    - Digital Data: http://edc2.usgs.gov/geodata/index.php
      [These data files are for use in geographical information systems (GIS) for analysis and integration with other geospatial data. The USGS offers free software for viewing some digital cartographic products.]
    - Geologic hazard maps: http://geomaps.wr.usgs.gov/pacnw/map.html
    - The National Map: http://nmviewogc.cr.usgs.gov/viewer.htm
    - To visualize available GIS data, ESRI offers a free GIS reader called "ArcExplorer" that may be helpful. http://www.esri.com/software/arcexplorer/index.html

Hazard-Specific Resources

- Coastal Erosion
    - Coastal Erosion Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_coastal-erosion_chapter.pdf. The coastal erosion chapter of the state Natural Hazards Mitigation Plan provides a characterization of the coastal erosion hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
    - Oregon Coastal Management Program: http://www.oregon.gov/LCD/OCMP/index.shtml
    - State of the Coast: http://oceanservice.noaa.gov/websites/retiredsites/supp_sotc_retired.html Includes a series of essays related to human-induced pressures on the environment and societal responses to environmental degradation. The essays are factual presentations; inferences are minimal.
    - HazNet, Sea Grant Natural Hazards Theme Team: http://www.haznet.org/. HazNet is the place to find out how Sea Grant programs nationwide are working together to better understand coastal natural hazards and develop ways to reduce their impacts on lives, property and coastal economies.

- Drought
    - Water Resources Department: Drought Page: http://www.wrd.state.or.us/OWRD/WR/drought.shtml. On this page and associated links you will find data and other information concerning the availability of water in Oregon for the current year. During dry times there is information from watermasters concerning their specific districts, as well as links to other agencies and local governments. "Near real time" links provide water levels and flow data for particular streams and rivers.

- Drought Impact Reporter: http://droughtreporter.unl.edu/
  Drought impacts are inherently hard to quantify, therefore there has not been a comprehensive and consistent methodology for quantifying drought impacts and economic losses in the United States. The Drought Impact Reporter is intended to be the initial step in creating a comprehensive database. The principal goal of the Drought Impact Reporter is to collect, quantify, and map reported drought impacts for the United States and provide access to the reports through interactive search tools.

  Click on "Oregon" visual to access state information. Select a time period (you may search from 1850 to present day). Choose all "impact categories" and click "submit" to view reports.
- National Drought Mitigation Center:
  http://www.drought.unl.edu/dm/index.html
- Drought Chapter, State Plan:
  http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_drought_chapter.pdf. The Drought chapter of the state Natural Hazards Mitigation Plan provides a characterization of the drought hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
- USGS Water Use in the United States: http://water.usgs.gov/watuse/
- National Drought Mitigation Center: http://www.drought.unl.edu/index.htm. The National Drought Mitigation Center (NDMC) helps people and institutions develop and implement measures to reduce societal vulnerability to drought. The NDMC, based at the University of Nebraska – Lincoln, stresses preparation and risk management rather than crisis management.
- NOAA's Drought Information Center: http://www.drought.noaa.gov/

- <u>Earthquake</u>
  - Seismic Monitor: http://www.iris.edu/seismon//. Seismic Monitor allows you to monitor global earthquakes in near real-time, visit seismic stations around the world, and search the web for earthquake or region-related information.
  - USGS
    - Earthquake Hazards Program: http://earthquake.usgs.gov. Provides historic and up-to-date information on earthquakes around the world.
    - 'Earthquakes:' http://pubs.usgs.gov/gip/earthq1/
  - Cascadia Region Earthquake Workgroup: http://www.crew.org/index.html
  - DOGAMI: http://www.oregongeology.com/sub/default.htm. The mission of the Department of Geology and Mineral Industries is to serve a broad public by providing a cost-effective source of geologic information for Oregonians and to use that information in partnership to reduce the future loss of life and property due to potentially devastating earthquakes, tsunami, landslides, floods, and other geologic hazards.
    - Geologic Hazards on the Oregon Coast
      http://www.oregon.gov/DOGAMI/earthquakes/Coastal/CoastalHazards

Main.shtml: includes information about coastal landslides, tsunamis, and earthquakes.

- Earthquake Hazards Program: http://earthquake.usgs.gov/
- National Earthquake Information Center: http://earthquake.usgs.gov/regional/neic/
- Relative earthquake hazard maps for selected urban areas in western Oregon: http://nwdata.geol.pdx.edu/DOGAMI/ims.html
- Earthquake Damage in Oregon: Preliminary estimates of future earthquake losses (HAZUS) http://www.oregongeology.com/sub/earthquakes/SP29SUMMARY.pdf

- Oregon Seismic Safety Policy Advisory Commission: http://www.wsspc.org/Members/OSSPAC/index.html. The Oregon Seismic Safety Policy Advisory Commission (OSSPAC), otherwise known as the Earthquake Commission, has the unique task of promoting earthquake awareness and preparedness through education, research, and legislation. The mission of OSSPAC is to positively influence decisions and policies regarding pre-disaster mitigation of earthquake and tsunami hazards, increase public understanding of hazard, risk, exposure, and vulnerability through education seminars, etc., and be responsive to the new studies and/or issues raised around earthquakes and tsunamis.
- Oregon Department of Consumer & Business Services – Building Codes Division: http://www.cbs.state.or.us/bcd/. The Building Codes Division (BCD) sets statewide standards for design, construction and alteration of buildings that include resistance to seismic forces. BCD is active on several earthquake committees and funds construction related continuing-education programs. BCD registers persons qualified to inspect buildings as safe or unsafe to occupy following an earthquake and works with OEM to assign inspection teams where they are needed.
- Earthquake Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_earthquake_chapter.pdf. The Earthquake chapter of the state Natural Hazards Mitigation Plan provides a characterization of the earthquake hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
- The Pacific Northwest Seismic Network: http://www.geophys.washington.edu/SEIS/PNSN/INFO_GENERAL/eqhazards.html. (All about earthquakes and geologic hazards of the Pacific Northwest).
- The Seismic Retrofit of Historic Buildings: http://www.nps.gov/history/hps/tps/briefs/brief41.htm

- <u>Flood</u>
  - Department of Land Conservation and Development (DLCD): http://www.lcd.state.or.us/. DLCD administers the State's Land Use Planning Program. The program is based on 19 Statewide Planning Goals,

including Goal 7, related to natural hazards. DLCD also serves as Oregon's federally designated agency to coordinate floodplain management in Oregon. DLCD maintains contact with flood prone communities throughout the state in order to help them meet the requirements of the NFIP and to ensure that they are prepared in case of flood. DLCD offers information on the NFIP, CRS and other FEMA - related programs. They also offer training courses on various flood mitigation programs.
**Contact DLCD to request NFIP repetitive loss information (an FMA requirement of the natural hazard mitigation plan).

- FEMA Q3 Flood Data: http://www.esri.com/data/download/fema/description.html. The Q3 Flood Data is developed by electronically scanning the current effective map panels of existing paper Flood Insurance Rate Maps (FIRMs). Certain key features are digitally captured and then converted into area features, such as floodplain boundaries. Using GIS software such as ArcGIS and ArcExplorer (Java Edition, ESRI's free data viewer) you can overlay the Q3 Flood Data with your own information (street networks, land parcels, customer addresses, etc.) to display potential flood risk zones and identify future marketing opportunities.
- Oregon Water Resources Department – Estimation of Peak Discharges: http://www.wrd.state.or.us/OWRD/SW/peak_flow.shtml. A study of the magnitude and frequency of floods in Oregon has been completed by the Oregon Water Resources Department (OWRD) with financial assistance from the Federal Emergency Management Agency, Oregon Department of Transportation, and the Association of Oregon Counties and with the cooperation of the U.S. Geological Survey. The study was undertaken to provide engineers and land managers with the information needed to make informed decisions about development in or near watercourses.
- Oregon Emergency Management (OEM): http://egov.oregon.gov/OOHS/OEM/. OEM administers FEMA's Hazard Mitigation Grant Program, which provides monies for acquisition, elevation, relocation, and demolition of structures located in the floodplain. OEM also administers FEMA's Flood Mitigation Assistance Program. This program provides assistance for NFIP insured structures only. OEM also helps local jurisdictions to develop local hazard mitigation plans. OEM is heavily involved in flood damage assessment and works mainly with disaster recovery and hazard mitigation programs. OEM provides training for local governments through workshops on recovery and mitigation. OEM also helps implement and manage federal disaster recovery programs.
- Flood Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_flood_chapter.pdf. The Flood chapter of the state Natural Hazards Mitigation Plan provides a characterization of the flood hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.

- Association of State Floodplain Managers: http://www.floods.org/home/default.asp
- Flood Damage in the United States: http://www.flooddamagedata.org/index.html
- National Association of Flood & Stormwater Management Agencies: http://www.nafsma.org/
- National Flood Determination Association: http://www.nfdaflood.com/
- Association of State Dam Safety Officials: http://www.damsafety.org
- River Management Society: http://www.river-management.org/index.asp
- River Network: http://www.rivernetwork.org/

- Landslide
  - DOGAMI: Geologic Hazards on the Oregon Coast http://www.oregon.gov/DOGAMI/earthquakes/Coastal/CoastalHazardsMain.shtml: includes information about coastal landslides, tsunamis, and earthquakes.
  - Landslide and Debris Flow Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_landslide_chapter.pdf. The Landslide and Debris Flow chapter of the state Natural Hazards Mitigation Plan provides a characterization of the landslide and debris flow hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
  - USGS: Landslides http://www.usgs.gov/hazards/landslides/
  - American Planning Association, Landslide Research: http://www.planning.org/landslides/docs/main.html. Although a number of successful techniques for identifying and mitigating landslide hazards have been developed through federal programs at USGS and FEMA, little of this information has reached planners and other public officials at the city, town, county, or regional levels who's incremental development decisions shape the landscape. The APA's research department embarked on a program to bring together solutions from multiple disciplines into a single source. It will help serve local planning efforts in identifying landslide hazards sufficiently early in the planning process so as to minimize exposure to landslide risks.
  - FEMA: Landslide and Debris Flows: http://www.fema.gov/hazard/landslide/

- Tsunami
  - USGS: http://pubs.usgs.gov/sir/2007/5283/. Wood, N., 2007, Variations in city exposure and sensitivity to tsunami hazards in Oregon: Reston, Va., USGS Scientific Investigations Report 2007-5283.
  - DOGAMI: Geologic Hazards on the Oregon Coast http://www.oregon.gov/DOGAMI/earthquakes/Coastal/CoastalHazardsMain.s

html: includes information about coastal landslides, tsunamis, and earthquakes.

- DOGAMI: Tsunami Evacuation Maps http://www.oregongeology.com/sub/earthquakes/Coastal/Tsubrochures.htm
- NOAA Center for Tsunami Research: http://nctr.pmel.noaa.gov/index.html
- National Tsunami Hazard Mitigation Program: http://nthmp.tsunami.gov/
- West Coast and Alaska Tsunami Warning Center: http://wcatwc.arh.noaa.gov/
- Tsunami Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_tsunami_chapter.pdf. The Tsunami chapter of the state Natural Hazards Mitigation Plan provides a characterization of the tsunami hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.

- <u>Volcano</u>
  - USGS
    - Cascades Volcano Observatory: http://vulcan.wr.usgs.gov/
    - Volcano Hazards Program: http://volcanoes.usgs.gov/ , and http://www.usgs.gov/hazards/volcanoes/
    - Volcano-Monitoring Techniques http://volcanoes.usgs.gov/About/What/Monitor/monitor.html
    - USGS Open-File Reports:
      - Crater Lake: http://vulcan.wr.usgs.gov/Volcanoes/CraterLake/Hazards/OFR97-487/framework.html
      - Mt. Hood: http://vulcan.wr.usgs.gov/Volcanoes/Hood/Hazards/OFR97-89/framework.html
      - Mt. Jefferson: http://vulcan.wr.usgs.gov/Volcanoes/Jefferson/Hazards/OFR99-24/framework.html
      - Newberry Volcano: http://vulcan.wr.usgs.gov/Volcanoes/Newberry/Hazards/OFR97-513/framework.html
      - Three Sisters Region: http://vulcan.wr.usgs.gov/Volcanoes/Sisters/Hazards/OFR99-437/framework.html
  - Volcanic Hazards Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_volcanic_chapter.pdf

- Wildfire
    - Oregon Department of Forestry: Oregon Department of Forestry seeks to promote environmental, economic, and community sustainability through the responsible management of Oregon's forests. http://egov.oregon.gov/ODF/
        - National Fire Plan Implementation in Oregon: Community Wildfire Protection Plans. http://www.oregon.gov/ODF/FIRE/FirePlans.shtml#Community_Wildfire_Protection_Plans__CWPP_. See "Current CWPP Efforts in Oregon."
    - InciWeb (Incident Information System): http://www.inciweb.org/ This website provides information about current (or very recent) wildfire incidents. It can provide information on past wildfire events, but only if you know the wildfire's name.
    - Oregon State Fire Marshal: http://egov.oregon.gov/OSP/SFM/. The Office of the State Fire Marshall seeks to protect people, their property and the environment from fires and hazardous materials.
    - Keep Oregon Green: http://www.keeporegongreen.org/. Keep Oregon Green strives to prevent human-caused wildfires by educating the public about preventative measures.
    - WUI – Fire Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_fire-wui_chapter.pdf. The WUI - Fire chapter of the state Natural Hazards Mitigation Plan provides a characterization of the wui - fire hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
    - Firewise: http://www.firewise.org/
    - Pacific Northwest National Fire Plan: http://www.nwfireplan.gov/
    - National Interagency Fire Center: http://www.nifc.gov/
    - National Database of State and Local Wildfire Mitigation Projects: http://www.wildfireprograms.com/index.html

- Windstorm / Winter Storm
    - Windstorms Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_windstorms_chapter.pdf. The Windstorms chapter of the state Natural Hazards Mitigation Plan provides a characterization of windstorms in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
    - Pacific Northwest Chapter ISA Hazard Tree Prevention: http://www.pnwisa.org/htp/index.html
    - FEMA – Taking Shelter From the Storm: Building a Safe Room Inside Your House: http://www.fema.gov/plan/prevent/saferoom/fema320.shtm

- Texas Tech University – Wind Engineering Research Center: http://www.wind.ttu.edu/
- The Oregon Weather Book, A State of Extremes: http://ocs.orst.edu/page_links/publications/weather_book/weather%20events/windstorms.pdf
- Winter Storms Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_winterstorm_chapter.pdf. The Winter Storms chapter of the state Natural Hazards Mitigation Plan provides a characterization of winter storms in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
- FEMA: Winter Storms and Extreme Cold: http://www.fema.gov/hazard/winter/index.shtm
- FEMA: During a Winter Storm: http://www.fema.gov/hazard/winter/wi_during.shtm
- NOAA's Winter Weather Internet References: http://www.noaanews.noaa.gov/stories/s300e.htm
- NOAA's National Weather Service: Winter Weather Safety and Awareness http://www.nws.noaa.gov/om/winter/index.shtml

- <u>Other</u>
  - National Assessment of Coastal Vulnerability to Sea-Level Rise: Preliminary Results for the U.S. Pacific Coast: http://pubs.usgs.gov/of/2000/of00-178/
  - Oregon Office of State Fire Marshall Community Right-to-Know Hazardous Substance Information Search: http://159.121.82.250/CR2k/cr2k.htm

Meeting: Region 3 Cities Risk Assessment
Date: April 15, 2009
Time: 9:00 am – 5:00 pm
Location: Marion County Public Works Building, 5155 Silverton Rd NE, Salem, OR

AGENDA

1. Overview of Workshop Agenda (***10 minutes***)
   - *Megan Findley, OPDR*

2. What is a Risk Assessment? (***30 minutes***)
   - *Andre LeDuc, OPDR*

3. What Does FEMA Expect in Plans Regarding Vulnerability? (***20 minutes***)
   - *Kristen Meyers, FEMA*

4. Assessing Natural Hazards & Community Vulnerability (***1 hour***)
   - *Nate Wood, USGS & Andre LeDuc, OPDR & Valerie Saiki, CIS*

Break, 20 minutes

5. Natural Hazards Overview & Discussion (***30 minutes***)
   - *Gregoor Passchier, OPDR*

6. Exercise: Identifying Community Assets & Vulnerabilities (***4 hours + 1hr Lunch***)
   - *Nate Wood, USGS & Andre LeDuc, OPDR*
   a. human population
   b. economy, cultural & historic resources
   c. environment
   d. land use & development
   e. infrastructure & critical facilities

7. Mitigation Actions & Next Steps (***30 minutes***)
   - *Megan Findley, OPDR*

Oregon Partnership for Disaster Resilience
Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.2305 • Fax: 541.346.2040

Meeting Sign-In

Region 3 Cities Risk Assessment Workshop. April 15, 2009; 9 am-5 pm
Marion County Public Works Building. 5155 Silverton Rd NE, Salem, OR.

Name	Representing	Email	Roundtrip mileage (if applicable)
Laurie Boyce	City of Aurora	recorder@ci.aurora.or.us	
Kelly Richardson	City of Aurora	clerk@ci.aurora.or.us	52 round trip
Joseph Murray	OMD, Oregon Emergency Mngt.	jmurray@oem.state.or.us	N/A (already 50% fed. funded)
Bill Burns	DOGAMI		

Name	Representing	Email	Roundtrip mileage (if applicable)
Sam Litke	City of Keizer	litkes@keizer.org	15
Kevin Watson	City of Keizer	watsonk@keizer.org	15
Julie Amicci	Tigard PETS	Juliepdx@hotmail.com	50
Bruce Anderson	- Keizer Chamber of Commerce - NW Natural	bruce.anderson@nwnatural.com	10

Name	Representing	Email	Roundtrip mileage (if applicable)
WILLIS HILL	CITY OF ALBANY	willis.hill@cityofalbany.net.	
ROD CONWAY	Keizer Fire District	rconway@keizerfire.com	
Rob Kissler	City of Keizer	KISSLERR@KEIZER.ORG	
Laurel Reimer	Resource Assistance for Rural Environments - Clackamas County	lreimer@co.clackamas.or.us	80
NATE WOOD	U.S. Geological Survey	nwood@usgs.gov	
Louise Kubo	University of Hawaii National Disaster Preparedness Training Center	kubo@hawaii.edu	
Valerie Saiki	City County Insurance Services	Vsaiki@ccisoregon.com	16
KRISTEN MEYERS	FEMA RX	kristen.meyers@DHS.gov	

Name	Representing	Email	Roundtrip mileage (if applicable)
Don Dolenc	City of Woodburn	don.dolenc@ci.woodburn.or.us	
Carrie Brennecke	City of Woodburn	carrie.brennecke@ci.woodburn.or.us	
Dan Brown	City of Woodburn	Dan.Brown@ci.woodburn.or.us	
Jim Hendryx	City of Woodburn	jim.hendryx@ci.woodburn.or.us	

Name	Representing	Email	Roundtrip mileage (if applicable)
Doreen Kelly	Silverton Together City of Silverton	dk@silverfalls.k12.or.us	
Ed Grambusch	Silverton Fire District	edgrambusch@silvertonfire.com	
Genie Stoll	Silverton Beverage Business	dstoll@verizon.net	
Rick Lewis	Silver Police Dept	rlewis@silverton.or.us	
Bryon Cosgrove	Silverton	bcosgrove@silverton.or.us	
Steve Kay	City of Silverton	skay@silverton.or.us	
Darrel Mathews	Silverton Small Business	bangsandburns@pngusa.net	
Rich Barstad	City of Silverton	rbarstad@silverton.or.us	
Nita Marr	Woodburn Police/City of Wdbn	nita.marr@ci.woodburn.or.us	

ANNEX TO MARION COUNTY BASIC EMERGENCY OPERATIONS PLAN

HAZARD ANALYSIS

I. PURPOSE

The purpose of this annex is to examine the range of hazards Marion County is subject to and makes an assessment to determine the relative risks associated with those hazards. It will also identify those hazards that would likely tax the ability of the County's emergency responders, "quantifying" them compared to one another to assist in establishing emergency planning priorities.

II. HAZARD ANALYSIS MATRIX

The hazards listed in the matrix below are the most likely to result in a disaster. This matrix is based on a hazard analysis system used nationally. It compiles a score for each of the identified hazards, and an explanation of the factors used in the scoring system. These scores indicate where the hazard should be ranked in emergency planning priorities. Following the table is a guide to the values used in the matrix.

HAZARD	HISTORY (WF=2)	VULNERABILITY (WF=5)	MAX THREAT (WF=10)	PROBABILITY (WF=7)	TOTAL
EARTHQUAKE	2 X 10 (H) 20	5 X 10 (H) 50	10 X 10 (H) 100	7 X 10 (H) 70	240
FLOOD	2 X 10 (H) 20	5 X 5 (M) 25	10 X 10 (H) 100	7 X 10 (H) 70	215
SEVERE WEATHER	2 X 10 (H) 20	5 X 10 (H) 50	10 X 10 (H) 100	7 X 10 (H) 70	240
CIVIL DISORDER/TERRORISM	2 X 1 (L) 2	5 X 10 (H) 50	10 X 10 (H) 100	7 X 5 (M) 35	187
DAM FAILURE	2 X 1 (L) 2	5 X 10 (H) 50	10 X 10 (H) 100	7 X 1 (L) 7	159
TRANSPORTATION. ACCIDENT HAZMAT	2 X 1 (L) 2	5 X 5 (M) 25	10 X 5 (M) 50	7 X 10 (H) 70	147
WILDLAND INTERFACE FIRE	2 X 1 (L) 2	5 X 5 (M) 25	10 X 5 (M) 50	7 X 5 (M) 35	112
VOLCANIC ERUPTION	2 X 1 (L) 2	5 X 5 (M) 25	10 X 5 (M) 50	7 X 1 (L) 7	84

Meeting: Goals & Action Item Work Session
Date: June 10, 2009
Time: 1:00 – 5:00 PM
Location: Marion County Public Works Building, 5155 Silverton Rd NE, Salem, OR

AGENDA

1. Overview of Day (***15 minutes***)
   - *Megan Findley, OPDR*
2. Mission & Goals (***30 minutes***)
   - *Gregoor Passchier, OPDR*
3. Actions Item Overview & Selection (***1 hour***)
   - *Megan Findley, OPDR & Group Discussions*

Break, 15 minutes

4. Action Item Development (***1.5 hours***)
   - *Megan Findley, OPDR & Group Discussions*
5. Conclusion & Next Steps (***30 minutes***)
   - *Megan Findley, OPDR*

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Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.2305 • Fax: 541.346.2040

Meeting Sign-In

Region 3 Cities Action Item Development Workshop. June 10, 2009; 1 pm-5 pm
Marion County Public Works Building. 5155 Silverton Rd NE, Salem, OR.

Name	Representing	Email	Roundtrip mileage (if applicable)
Laurie Boyce	City of Aurora	recorder@ci.aurora.or.us	
Kelly Richardson	City of Aurora	Clerk@ci.aurora.or.us	52 miles
Jason Tlusty	WOODBURN P.D.	jason.tlusty@ci.woodburn.or.us	
Natalie LABOSSIERE	WOODBURN Planning	natalie.labossiere@ci.woodburn.or.us	
DARREL MATHEWS	SILVERTON	bangsandburns@pngusa.net	
Nita Marr	Woodburn P.D.	nita.marr@ci.woodburn.or.us	34mi. R.T.
Brijon Cosgrove	City of Silverton	bcosgrove@silvertonor.us	24

Name	Representing	Email	Roundtrip mileage (if applicable)
Rick Lewis	City of Silverton	rlewis@silverton.or.us	NA
Genie Stoll	City of Silverton	dstoll@verizon.net	NA
Doreen Kelly	Silverton Together	doreen@silvertontogether.com	
Ed Grambusch	Silverton Fire District	edgrambusch@silvertonfire.com	-NA-
DARREL MATHEWS	SILVERTON SMALL BUSINESS	bangsandburns@pngusa.net	N/A
Rich Barstad	City of Silverton	rbarstad@silverton.or.us	N/A

Name	Representing	Email	Roundtrip mileage (if applicable)
Kevin Watson	City of Keizer	watsonk@keizer.org	20
Sam Litke	City of Keizer	litkes@keizer.org	20

Eligible and Ineligible Mitigation Projects

(The following language is taken from the Federal Emergency Management Agency's FY2 2010 Hazard Mitigation Assistance (HMA) Unified Guidance. This is the guidance document for HMA applications submitted during the FY 2010 grant cycle and for disasters occurring on or after June 1, 2009). Please see the following link for more information: http://www.fema.gov/library/viewRecord.do?id=3649

D.1.1 [Eligible] Mitigation Projects

♦ **Property Acquisition and Structure Demolition –** The acquisition of an existing at-risk structure and, typically, the underlying land, and conversion of the land to open space through the demolition of the structure. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions. For property acquisition and structure demolition projects, see Part IX A.

♦ **Property Acquisition and Structure Relocation –** The physical relocation of an existing structure to an area outside of a hazard-prone area, such as the Special Flood Hazard Area (SFHA) or a regulatory erosion zone and, typically, the acquisition of the underlying land. Relocation must conform to all applicable State and local regulations. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions. For property acquisition and structure relocation projects, see Part IX A.

♦ **Structure Elevation –** Physically raising an existing structure to an elevation at or above the Base Flood Elevation (BFE) or higher if required by FEMA or local ordinance. Structure elevation may be achieved through a variety of methods, including elevating on continuous foundation walls; elevating on open foundations, such as piles, piers, posts, or columns; and elevating on fill. Foundations must be designed to properly address all loads, be appropriately connected to the floor structure above, and utilities must be properly elevated as well. FEMA encourages Applicants and subapplicants to design all structure elevation projects in accordance with the American Society of Civil Engineers (ASCE) 24-05 *Flood Resistant Design and Construction*. For additional information about the NFIP and structure elevation projects, see Part X C.1.

♦ **Mitigation Reconstruction –** The construction of an improved, elevated building on the same site where an existing building and/or foundation has been partially or completely demolished or destroyed. Mitigation reconstruction is only permitted if traditional structure elevation cannot be implemented and for structures outside of the regulatory floodway or coastal high hazard area (Zone V) as identified by the existing best available flood hazard data. Activities that result in the construction of new living space at or above the BFE will only be considered when consistent with the Mitigation Reconstruction requirements. Such activities are only eligible under the **SRL** Pilot program. For additional information about mitigation reconstruction projects, see Part IX D.

♦ **Dry Floodproofing –** Techniques applied to keep structures dry by sealing the structure to keep floodwaters out**.** For all dry floodproofing activities, FEMA

encourages Applicants and sub-applicants to design all dry floodproofing projects in accordance with ASCE 24-05 *Flood Resistant Design and Construction.*

- **Dry Floodproofing of Historic Residential Structures** is permissible only when other techniques that would mitigate to the BFE would cause the structure to lose its status as defined a Historic Structure in 44 CFR Part 59.1.
- **Dry Floodproofing of Non-residential Structures** must be performed in accordance with NFIP Technical Bulletin 3-93, *Non-Residential Floodproofing – Requirements and Certification*, and the requirements pertaining to dry floodproofing of nonresidential structures found in 44 CFR Parts 60.3(b)(5) and (c)(4).

♦ **Minor Localized Flood Reduction Projects –** These projects may include the installation or modification of culverts and floodgates, minor floodwall systems that generally protect an individual structure or facility, stormwater management activities such as creating retention and detention basins, and the upgrade of culverts to bridges. These projects must not duplicate the flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.

- For **FMA**, **RFC**, and **SRL** at least 50 percent of the structures directly benefiting from this mitigation activity must be NFIP-insured. For **RFC** and **SRL**, these projects must primarily benefit RFC or SRL structures, respectively. Documentation must be provided in the sub-application that identifies all structures that will benefit from this mitigation activity.

♦ **Structural Retrofitting of Existing Buildings –** Modifications to the structural elements of a building to reduce or eliminate the risk of future damage and to protect inhabitants. The structural elements of a building that are essential to protect in order to prevent damage include foundations, load-bearing walls, beams, columns, structural floors and roofs, and the connections between these elements.

♦ **Non-structural Retrofitting of Existing Buildings and Facilities –** Modifications to the non-structural elements of a building or facility to reduce or eliminate the risk of future damage and to protect inhabitants. Non-structural retrofits may include bracing of building contents to prevent earthquake damage or the elevation of heating and ventilation systems.

♦ **Safe Room Construction –** Safe room construction projects are designed to provide immediate live safety protection for people in public and private structures from tornado and severe wind events, including hurricanes. For HMA, the term "safe room" only applies to extreme wind (combined tornado and hurricane) residential, non-residential, and community safe rooms; tornado community safe rooms; and hurricane community safe room. This type of project includes retrofits of existing facilities or new safe room construction projects, and applies to both single and multi-use facilities. For additional information, see Part IX C.

♦ **Infrastructure Retrofit –** Measures to reduce risk to existing utility systems, roads, and bridges.

♦ **Soil Stabilization –** Projects to reduce risk to structures or infrastructure from erosion and landslides, including installing geo-textiles, sod stabilization, installing vegetative buffer strips, preserving mature vegetation, decreasing slope angles, and stabilizing with rip rap and other means of slope anchoring. These projects must not duplicate the activities of other Federal agencies.

♦ **Wildfire Mitigation** – Projects to mitigate the risk to at-risk structures and associated loss of life from the threat of future wildfire through:

- **Defensible Space for Wildfire –** Projects creating perimeters around homes, structures, and critical facilities through the removal or reduction of flammable vegetation. For additional information, see Part IX B.3.1.
- **Application of Ignition-resistant Construction –** Projects that apply ignition resistant techniques and/or non-combustible materials on new and existing homes, structures, and critical facilities. For additional information, see Part IX B.3.2.
- **Hazardous Fuels Reduction –** Projects that remove vegetative fuels proximate to the at-risk structure that, if ignited, pose significant threat to human life and property, especially critical facilities. For additional information, see Part IX B.3.3.

♦ **Post-Disaster Code Enforcement –** Projects designed to support the post-disaster rebuilding effort by ensuring that sufficient expertise is on hand to ensure appropriate codes and standards, including NFIP local ordinance requirements, are utilized and enforced. For additional information, see Part VIII A.8.

♦ **5% Initiative Projects –** These projects provide an opportunity to fund mitigation actions that are consistent with the goals and objectives of the State and local Hazard Mitigation Plans and meet all HMGP program requirements, but for which it may be difficult to conduct a standard BCA to prove cost effectiveness. For additional information, see Part VIII A.10.

D.2 Ineligible Activities

♦ Projects that do not reduce the risk to people, homes, neighborhoods, structures, or infrastructure;

♦ Projects that are dependent on another phase of a project(s) in order to be effective and/or feasible (i.e., not a stand-alone mitigation project that solves a problem independently or constitutes a functional portion of a solution.);

♦ Projects for which actual physical work such as groundbreaking, demolition, or construction of a raised foundation has occurred prior to award. Projects for which demolition and debris removal related to structures proposed for acquisition or mitigation reconstruction has already occurred may be eligible when such activities were initiated or completed under the FEMA Public Assistance program to alleviate a health or safety hazard as a result of a disaster;

♦ Projects constructing new buildings or facilities with the exception of safe room construction and SRL mitigation reconstruction;

♦ Projects that create revolving loan funds;

♦ Activities required as a result of negligence or intentional actions, or the reimbursement of legal obligations such as those imposed by a legal settlement, court order, or State law;

♦ Projects located in a Coastal Barrier Resource System (CBRS) Unit, or in an Otherwise Protected Area;

♦ Activities on Federal lands or associated with facilities owned by another Federal entity;

♦ Major flood control projects related to the construction, demolition, or repair of dams, dikes, levees, floodwalls, seawalls, groins, jetties, breakwaters, and erosion projects related to beach nourishment or re-nourishment;

♦ Projects for hazardous fuels reduction in excess of 2 miles from structures;

♦ Projects that address unmet needs from a disaster that are not related to mitigation;

♦ Retrofitting facilities primarily used for religious purposes, such as places of worship (or other projects that solely benefit religious organizations). A place of worship may, however, be included in a property acquisition and structure demolition or relocation project provided that the project benefits the entire community, such as when the whole neighborhood or community is being removed from the hazard area;

♦ Projects that only address man-made hazards;

♦ Projects that address operation, deferred or future maintenance, repairs, or replacement (without a change in the level of protection provided) of existing structures, facilities, or infrastructure (e.g., dredging, debris removal, replacement of obsolete utility systems, bridges, and facility repair/rehabilitation);

♦ Projects to do the following:

• Landscaping for ornamentation (trees, shrubs, etc);

• Site remediation of hazardous materials (with the exception eligible activities such as, the abatement of asbestos and/or lead-based paint and the removal of household hazardous wastes to an approved landfill);

• Water quality infrastructure;

• Address ecological or agricultural issues;

• Protection of the environment and/or watersheds;

• Forest management;

• Prescribed burning or clear-cutting;

• Creation and maintenance of fire breaks, access roads, or staging areas; and

• Irrigation systems;

♦ Mapping, flood studies, and planning activities, such as plan revisions/amendments or risk assessments, when they do not result in a FEMA-approved hazard mitigation plan;

♦ Studies not directly related to the design and implementation of a proposed mitigation project; and

♦ Preparedness measures and response equipment (e.g., response training, electronic evacuation road signs, interoperable communications equipment).

Meeting: Plan Implementation & Maintenance Work Session
Date: July 29, 2009
Time: 1:00 – 5:00 PM
Location: Marion County Public Works Building, 5155 Silverton Rd NE, Salem, OR

AGENDA

1. Workshop Overview (***10 minutes***)
   - *Megan Findley, OPDR*
2. Grant Opportunities & Resources Overview (***15 minutes***)
   - *Gregoor Passchier, OPDR*
3. Identifying Conveners & Members of the Coordinating Body (***30 minutes***)
   - *Megan Findley, OPDR & Group Discussions*
4. Project Prioritization Process (***30 minutes***)
   - *Megan Findley, OPDR*

Break, 15 minutes

5. Plan Maintenance Scheduling & Five Year Updates (***45 minutes***)
   - *Krista Dillon, OPDR & Group Discussions*
6. Continued Public Involvement (***30 minutes***)
   - *Gregoor Passchier, OPDR & Group Discussions*
7. Moving Projects Forward (***20 minutes***)
   - *Krista Dillon, OPDR*
8. Benefit Cost Analysis (***45 minutes***)
   - *Dennis Sigrist, OEM*

Oregon Partnership for Disaster Resilience
Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.2305 • Fax: 541.346.2040

Meeting Sign-In

Region 3 Cities Plan Implementation and Maintenance Workshop. July 29, 2009; 1 pm-5 pm
Marion County Public Works Building. 5155 Silverton Rd NE, Salem, OR.

Name	Representing	Email	Roundtrip mileage (if applicable)
Laurie Boyce	City of Aurora	Recorder@ci.aurora.or.us	
Kelly Richardson	City of Aurora	Clerk@ci.aurora.or.us	52
Bryan Cosgrove	City of Silverton	bcosgrove@silvertonor.us	30
STEVE KAY	CITY OF SILVERTON	skay@silverton.or.us	30
DARREL MATHEWS	CITY/SILVERTON	N/A	N/A
Natalie Labossiere	Woodburn	natalie.labossiere@ci.woodburn.or.us	40
Genie Stoll	Silverton	dstoll@wvi.com.net	30

Name	Representing	Email	Roundtrip mileage (if applicable)
Rich Barstad	City of Silverton	rbarstad@silverton.or.us	
Rick Lewis	City of Silverton	rlewis@silverton.or.us	
Nita Marr	City of Woodburn	nita.marr@ci.woodburn.or.us	34mi.
Ed Grambusch	Silverton Fire Dist.	edgrambusch@SilvertonFire.com	
Sam Little	City of Keizer	SLittle@Keizer.org	

benefit/cost analysis

Dennis Sigrist
OMD-Oregon Emergency Management

July 29, 2009

What is benefit/cost analysis?

What is benefit/cost analysis?

Benefit/cost analysis is a way of determining if the anticipated benefits being computed on a net present value basis are greater than the cost of a project.

FEMA provides benefit/cost analysis software (standalone software application) for the following hazards: earthquake, flood, wildfire, wind and other.

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factors to consider during a BCA

- **total project cost**
- **life of the project**
- **maintenance costs**
- **displacement costs**
- **value of the property being protected**
- **Specific, documented past damages**
- **event frequency and severity/magnitude**
- **level of protection provided**

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benefit/cost analysis

a cost-effective project will have a benefit/cost ratio > 1.0

benefit/cost = bc ratio (BCR)

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Why conduct benefit/cost analysis?

- **meet statutory eligibility requirements required for federal grant funding**
- **determine whether or not a project is "worth" doing**
- **have a common basis on which to compare projects**
- **show that mitigation works (post-disaster loss avoidance studies**

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statutory and regulatory documents

Some of the legal and regulatory documents for benefit/cost analysis are:

OMB Circular A-94 – Benefit/Cost Analysis of Federal Programs

Federal Disaster Assistance – Stafford Act

Unified Hazard Mitigation Assistance (HMA)

- **All hazard: PDM and for flood: FMA, SRL and RFC**
- **Hazard Mitigation Grant Program - 44 CFR Part 206**

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definition

benefits – Are the expected avoided damages and avoided losses over the lifetime of the mitigation project.

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mitigation project benefits

The project benefit calculation is based on four key elements:

- **event frequency and severity**
- **damages and losses before mitigation**
- **damages and losses after mitigation**
- **economic factors including the discount rate and the mitigation project useful lifetime**

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project benefits: direct damages and losses avoided

- **avoided damages to buildings and other facilities or infrastructure**
- **avoided damages to contents**
- **avoided loss of function costs**
- **avoided emergency response costs**

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mitigation project costs

- governed by OMB A-87, *Cost Principles for State, Local, and Indian Tribal Governments*
- cost of entire project (not just the costs represented in the federal share of the application budget) must be considered in b/c analysis

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project costs

- engineering/design fees and structural analysis
- construction/retrofit costs
- construction management costs
- project management costs
- property acquisition costs
- relocation expenses (URA)
- permit fees

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the benefit/cost model

economics terminology and concepts

- **net present value – Is the value today of money that you will receive in the future.**

- **discount rate – Is an interest rate used to determine the time value of money. For federally funded mitigation projects, the discount rate is established by the U.S. Office of Management and Budget (OMB) to be 7%. This number has not changed for some time.**

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definitions

project useful lifetime – Is the estimated time period over which the mitigation project will maintain its effectiveness in preventing or reducing damages and losses from future disasters, e.g., 30, 50 or 100 years.

present value coefficient – The PVC expresses the combined effect of the discount rate and the project useful lifetime on the net present value of future benefits.

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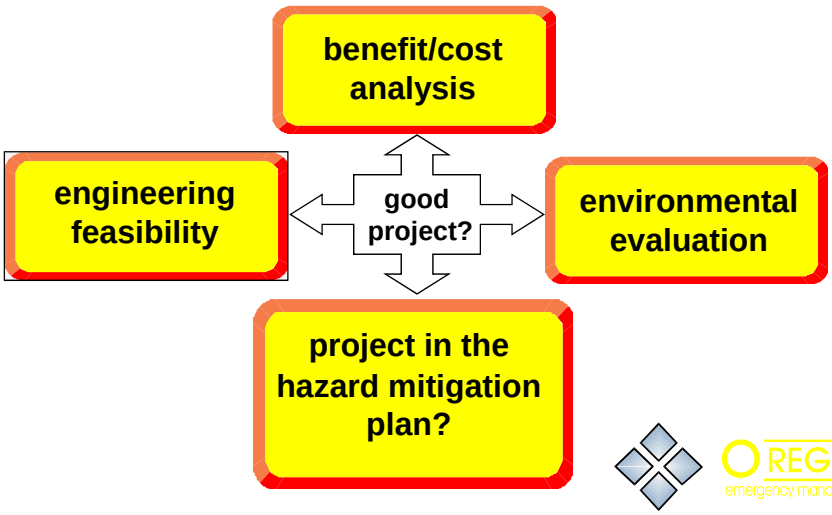
benefit/cost analysis example

Flood Depth (feet)	Expected Annual Damages *Before* Mitigation	Expected Annual Damages *After* Mitigation	Expected Annual Avoided Damages and Losses
0	$1,312	$ 0	$1,312
1	$1,765	$ 0	$1,765
2	$2,124	$ 0	$2,124
3	$ 673	$ 0	$ 673
4	$ 315	$63	$ 252
5	$ 123	$49	$ 74
Totals	$6,312	$112	$6,200
	PVC (7% Discount Rate, 30 years)		12.41
	Net Present Value of Future Benefits		$76,942
	Costs		$20,000
	Benefit-Cost Ratio		3.85

project development



sources of information

- **contractor support**
- **FEMA Internet**
  http:////www.bchelpline.com/BCAToolkit/
- ***BCA Toolkit* version 4.5, which includes:** New
  - **Downloadable software from FEMA**
  - **Runs under Windows XP/Vista**
  - **Standalone Application**
  - **Built-in Help/Guidance**
  - **Construction cost estimator**
  - **Damage-Frequency Assessment**
  - **Export/Import Capability**
  - **Project Portfolios**

available free of charge via:
866-222-3580 or
web: www.bchelpline.com

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questions or comments?

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StatesmanJournal.com
OREGON'S MID-WILLAMETTE VALLEY

September 30, 2009

Plan developed to cope with disasters

Natural hazards that could affect the city include flood, quake

By Danielle Peterson
Appeal Tribune

Silverton is among a handful of Marion County cities that have recently developed plans to address potential natural disasters in the area.

The plans are part of the county's multi-jurisdictional Natural Hazards Mitigation Plan and include a community profile, risk assessment, goals and guidelines for implementation.

Silverton, Aurora, Woodburn and Keizer worked with the Oregon Partnership for Disaster Resilience at the University of Oregon in developing the plans.

"Basically, they write the plan for you, but you provide the information," Silverton City Manager Bryan Cosgrove said.

A steering committee comprised of local police, fire and city officials, and business owners, helped with the planning process.

Some of the natural hazards that could affect Silverton include a drought, flood, earthquake, landslide, wildfire and severe storm.

"The primary importance of this is pre-planning for emergency response," Cosgrove said. "You're identifying your hazards in advance so you know where to put your resources."

Cosgrove said this is the first time that the city has had a plan like this in place.

"This is new to the city," he said. "It's something that all cities are going to be required to do all across the U.S."

He said the goal is to have the city council adopt the plan in November. Once that happens, the city will be eligible for more federal funding for projects related to mitigation of natural hazards.

A link to the plan is available on the city's Web site.

The plan will be evaluated annually and updated every five years.

"It becomes a living document," Cosgrove said. "A committee will be formed to keep it updated. You can't just leave it on the shelf."

djpeterson@salem.gannett.com

Survey Monkey Stakeholder Interview Questions

Greetings:

You have been selected to participate in a survey that will assist in your community's development of a natural hazards mitigation* plan. This survey is being distributed to a select group of stakeholders in the cities of Aurora, Keizer, Silverton and Woodburn. Your contributions will be reflected in your community's mitigation plan where possible. Please take a moment to review the information below, and to complete 8 questions on the following pages. This survey should take about 15 minutes to complete.

The questions that you will see on the following pages will ask about the natural hazards in your community, and natural hazards mitigation activities that you would like to see implemented. This survey was developed by the Oregon Partnership for Disaster Resilience at the University of Oregon. Please visit the Partnership's website (www.oregonshowcase.og) for more information regarding natural hazards mitigation in your community.

If you have any questions or concerns, please contact Megan Findley, Pre-Disaster Mitigation Program Manager, at mfindley@uoregon.edu or 541.346.2305.

*Natural hazards mitigation is defined as permanently reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects. The natural hazards that will be addressed in the community mitigation plans include droughts, floods, wildfires, landslides, earthquakes, wind storms, winter storms, and volcanoes.

Questions

1. Please identify the organization that you represent.
    - Include a box for no organization and/or citizen representative
2. What is the primary mission and/or purpose of your organization?
    - Include a "does not apply" box
3. From your perspective, what hazard(s) pose the greatest threat to your community?
    - Give Matrix
4. What natural hazard events have affected your community in the past? Please explain the impacts and/or damages sustained from those events.
5. Does your organization have a plan in place to respond to/recover from natural hazards?
6. Natural hazard mitigation is the act of reducing or eliminating future loss of life, property, or injuries resulting from hazards through short term and long-term activities.

   Mitigation actions can be grouped into the following six types:

- Prevention: government administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
- Property Protection: actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area.
- Public Education & Awareness: actions to inform and educate citizens, elected officials and property owners about hazards and mitigation strategies.
- Natural Resource Protection: actions that minimize hazard losses and also preserve or restore the functions of natural systems.
- Emergency Services: actions that protect people and property during and immediately after a disaster or hazard event.
- Structural Projects: actions that involve the construction of structures to reduce the impact of a hazard.

What types of mitigation activities would you like to see happen within your community? Please provide examples if you have specific projects in mind:

7. Any interested persons, groups and/or organizations can assist in building the community's resilience to natural hazards. For example, neighborhood groups can teach residents in forested areas about how to reduce risk from wildfires by installing metal roofs or eliminating combustible materials around buildings.

   Is your organization able and/or willing to assist with any of the following? Please check all that apply.

   - Education and outreach
   - Information dissemination
   - Plan/Project Implementation
   - Other _____

8. Would you like to be contacted in the future to review plan drafts?
   - No, thanks
   - Yes, please

9. Would you like to be contacted for further discussion?
   - No, thanks
   - Yes, please

Aurora Community Stakeholders

Organization
City of Aurora
Marion County
City of Aurora
Aurora Rural Fire Protection District
City of Aurora
City of Aurora
Chamber of Commerce/Aurora Colony Visitors Association
Aurora Colony Historical Society
Pudding River Watershed Council/Cascadia Planners
North Marion School District-Public/Private Schools K-12
Marion County
Aurora State Airport
Builders, Developers, and Realtors
Associated Press
KATU Channel 2
KGW Channel 8
KOIN Channel 6
KPTV Channel 12
Canby Herald

Keizer Community Stakeholders

Name	Job Title	Organization
Chris Eppley	City Manager	City of Keizer
Shannon Johnson	City Attorney	Lien & Johnson
Susan Gahlsdorf	Finance Director	City of Keizer
Jim Trussel	Building Inspector	Marion County
John Teague	Captain	City of Keizer Police
Nate Brown	Community Development Director	City of Keizer
Cathy Miles	Owner	Shelter Management Inc.
Christine Dierker	Director	Chamber of Commerce
Cheryl Lacom-Anderson	Executive Dir.	Avamere Court
David Fridenmaker	Planning Director	Salem/Keizer School District
Gene Bloom	Safety Officer	Salem/Keizer School District
John Sullivan	General Manager	Loren's Sanitation Service
Mary Kanz	Executive Dir.	Mid-Valley Garbage & Recycling
Jamie Pedersen	Office Manager	Mid-Valley Garbage & Recycling
Francis Kessler	Plant Manager	City of Salem Wastewater
Roger Kuhlman	Engineering & Operations Manager	Salem Electric
John Werst	Associate Pastor	Dayspring Fellowship Church
Mark Caillier	City Councilor	City of Keizer
Elizabeth Sagmiller	Stormwater Manager	City of Keizer
Ron Comcast	Key Customer Manager	Portland General Electric
Doug Wells	Manager	Emerald Pointe
Lyndon Zaitz	Owner	Keizer Times Newspaper
Rhonda Rich		West Keizer Neighborhood Association
Nancy	Assistant to the President	Marion Polk Food Share
Ron Hays	President	Marion Polk Food Share
Allen Prell		Gubser Neighborhood Association
Bill Lawyer	PW Superintendent	City of Keizer
Pat Taylor	Public Works	City of Keizer
Mike Griffin	Public Works	City of Keizer
Matt Reyes	Public Works	City of Keizer
Jenniffer Warner	Public Works	City of Keizer
Ray Hansen	Co-Coordinator	EVAK
Jacque Moir	Co-Coordinator	EVAK
Erica		Salem Clinic

Silverton Community Stakeholders

Name	Organization
Pete Paradis - Maintenance	Silverton School District
Craig Roesslier - Superintendent	
Jamie Baxter - Emergency Man.	Silverton Hospital
Brian Van Smoorenburg	NW Natural Gas
Bill Burns	State Geology Dept
Rock Sander	PGE
Robyn Murbach	Allied Waste
Jeff Kresner	Red Cross
Stacy Palmer - Director	Chamber of Commerce
Ray Hunter	Historical Society
Steve Starner - Sewer Plant	Watershed Council
Brenda Sturdevant - Director	Silverton Together
	Hispanis Unidas
	SACA
	Head Start
Pete Larson (Bruce Pac)	Large Business
Bill Cummins (also City Council)	Large Business
Darren Rybloom (Roths)	Large Business
Dixon Bledsoe	Realtor
Mason Branstetter	Realtor
Dennis Downey	Builder
Maurice Leach - SCAN Tv	Media
Gus Frederick	Silverton Grange
Stu Rasmussen	Mayor
	Service Club - Rotary
	Service Club - Kiwanis
	Service Club - Zenith Women
	Service Club - Lions
	Service Club - Elks
Oregon Garden	Community Organization
	Faith Community
Ken Hector	General Public
Michael Jesse	Small Business
Sam Sloper	Financial Institution
Capt. Appt - National Guard	State of Oregon

Woodburn Community Stakeholders

Name	Job Title	Organization
Charlie Blevins	Police Captian	City of Woodburn
Christine Vistica	Business Manager	St. Lukes Catholic Church
Deb Yager	Member	Woodburn Chamber of Commerce
Elias Villegas	Director	Chemeketa Community College-Woodburn
Eric Liljequist	Assistant City Engineer	City of Woodburn
Jim Row	Community Services Director	City of Woodburn
Kathy Figley	Mayor	City of Woodburn
Kevin Hendricks	Fire Chief	Woodburn Fire District
Matt Gwynn	Public Works Division Manger - Maintenance	City of Woodburn
Natalie Labossiere	Senior Planner	City of Woodburn
Randy Scott	Public Works Division Manger - Water Resources	City of Woodburn
Scott Derickson	City Administator	City of Woodburn
Shawn K. Baird	President	Woodburn Ambulance Services

Please identify the organization that you represent.

Answer Options	Response Count
	10
answered question	10
skipped question	2

Number	Response Text
1	Silver Falls SD
2	Silverton Together
3	Silverton Chamber of Commerce and Visitors Center
4	SILVERTON LIONS CLUB, A MEMBER OF THE INTERNATIONAL ASSOC. OF LIONS CLUBS, APPOXIMATELY 5,000 CLUBS WORLDWIDE. APPROX. 190 CLUBS IN OREGON SCATTERED THRUGHOUT THE STATE.
5	self
6	Silverton Hospital Network
7	City of Silverton, Oregon
8	West Coast Bank
9	Woodburn Mt Angel Silverton Ambulance Service
10	City of Silverton Public Works-Water Quality Division

What is the primary mission and/or purpose of your organization?	
Answer Options	**Response Count**
	9
answered question	**9**
skipped question	**3**

Number	Response Text
1	K-12 educaton
2	To strengthen Families
3	Support business in the community and act as an ambassador for visitors to our community.
4	OUR MISSION IS EXTENSIVE. RECOMMEND YOU CONTACT OUR MD-36 (ESSENTIALLY OREGON) EXEC. ADMINISTRATOR, PCC (LION) DONALD D. ADAMS AT d.adams@premier-gear.com OR lionsclubsof@earthlink.net FOR A COMPREHENSIVE ANSWER.
5	Healthcare
6	City Government - service provider
7	Community banking services
8	Provide emergency medical services and ambulance transport
9	provide safe drinking water and protect the quality of water in our receiving stream

In which city is your organization located?

Answer Options	Response Frequency	Response Count
Aurora	8.3%	1
Keizer	0.0%	0
Silverton	100.0%	12
Woodburn	16.7%	2
Other (please specify)		2
	answered question	12
	skipped question	0

Number	Other (please specify)
1	260 nsquare miles, includes portion of Clackamas County
2	Mt Angel

The following natural hazards are included within your community's natural hazards mitigation plan. Please estimate the level of risk that you think each hazard poses to your community.

Answer Options	Extreme Risk	Some Risk	Little Risk	No Risk	Do Not Know	Response Count
Drought	0	4	5	3	0	12
Earthquake	4	8	0	0	0	12
Flood	3	6	3	0	0	12
Landslide / Debris Flow	1	4	5	1	1	12
Wildfire	1	4	7	0	0	12
Volcanic Eruption	0	3	4	4	1	12
Wind Storm	2	7	3	0	0	12
Severe Winter Storm	3	10	0	0	0	12
					answered question	12
					skipped question	0

Do you recall any instances in which the following natural hazards affected your community?			
Answer Options	**Yes**	**No**	**Response Count**
Drought	1	10	11
Earthquake	9	2	11
Flood	11	0	11
Landslide / Debris Flow	2	10	12
Volcanic Eruption	6	6	12
Wildfire	2	10	12
Wind Storm	9	2	11
Severe Winter Storm	11	0	11
		answered question	**12**
		skipped question	**0**

If you answered 'yes' to any of the hazards above, please describe the events that occurred (i.e., dates of events and/or a description of community impacts that occurred).		
Answer Options	**Response Frequency**	**Response Count**
Drought	20.0%	2
Flood	90.0%	9
Earthquake	70.0%	7
Landslide / Debris Flow	10.0%	1
Volcanic Eruption	60.0%	6
Wildfire	30.0%	3
Wind Storm	80.0%	8
Severe Winter Storm	100.0%	10
	answered question	**10**
	skipped question	**2**

Number	Drought	Flood	Earthquake	Landslide / Debris Flow	Volcanic Eruption	Wildfire	Wind Storm	Severe Winter Storm
4	NO PERSONAL KNOWLEDGE WITHIN MY 34 YEAR SOJOURN IN SILVERTON, EXCEPT THAT WE ARE IN AN AGRARIAN AREA	SEASONAL LIMITED FLOODING OF SILVER CREEK ANNUALLY WITH AN OCCASIONAL SEVERE FLOODING OF THE LOWLANDS	EARTHQUAKES IN MOLALLA AND SCOTTS MILLS AREAS MADE SLIGHT DAMAGES.	SILVERTON HAS NUMEROUS STEEP HILLSIDES AND MILES OF HIGHWAY INTO THOSE HILLS WITH (IT SEEMS TO ME) HIGH POTENTIAL FOR LANDSLIDES AND DEGRIS FLOW IN SILVER CREEK IS SEVERE DURING FOODING	ERUPTION OF MT. ST HELENS IN 198X CREATED MODEST ASH DEPOSITING THROUGHOUT THE AREA. LITTLE OR NO DAMAGE TO MY KNOWLEDGE	SILVERTON IS SURROUNDED BY AND INCLUDES WITHIN ITS BOUNDARIES FORESTLANDS CAPABLE OF SEVERE FIRE DANGER PARTICULARLY IN TIMES OF DROUGHT WITH ANY ATTENDANT WINDS	WITHIN SIVERTON'S BOUNDARIES, AND TO SOME EXTENT BEYOND, ARE MANY MANY VERY LARGE OAK OR SIMILAR TREES THAT ARE PROWN TO HAVING LARGE LIMBS FALL ONTO STREETS AND HOUSES DURING WIND STORMS. THE RECENT (MARCH '09) WINDS FELLED SEVERAL SUCH TREES AS WELL AS TEARING OFF HUGE LIMBS CAPABLE OF KILLING.	GENERALLY THE WINTERS IN WILLAMETTE VALLEY ARE RELATIVELY MILD AND DO NOT CREATE "EVENTS" OF NOTE, HOWEVER, THIS TENDS TO CAUSE ITS POPULATION TO LIMITS ITS CONCERN FOR SEVERE WINTER STORMS. THIS THUS CREATES A DISTAIN FOR SERIOUS PREPARATION WHEN A "SEVERE STORM" IS PROJECTED BY WEATHR REPORTS. THIS IN TURN CREATES PERHAPS UNNECESSARY SUFFERING OR DAMAGE.

Number	Drought	Flood	Earthquake	Landslide / Debris Flow	Volcanic Eruption	Wildfire	Wind Storm	Severe Winter Storm
1	low water levels in Abuqua Dam	1990's	mid 1990's spring break quake		Mt. St. Helens		2000's damage to school roofs	ice, snow, road closures
2		From extreme Rain			Mt. St. Helens	Constant		Ice Storms, broken trees, downed lines, power outages
3		Rain records in 97? - Silver Creek hit flood stages - homes on the creek, business basements flooded	Spring Break - mid 90's - damage to historic homes and buildings.				Columbus Day storm - trees down, roads blocked, power lines down - power out 2-5 days.	Ice storms - power outages, business and residential ice damage
5							Winter storm of 2008 + previous years 1982? 1976?	Columbus day Storm
6		Feb 1996, Silver Creek flooded adjacent properties	Molalla quake caused minor damage to some buildings		Mt. St. Helen's in 1980? Ash accumulations caused minor problems		Columbus Day storm caused major damage, with power out for days	Dec 2008 storm - power out 5 days in some neighborhoods. Falling tree limbs caused significant damage
7		1996 Flood event - plus possibility of Silverton Reservoir Dam failure would result in catastrophic flood	"Spring Break Quake" 1994 (?) - proximity toknown Mt. Angel fault line		Mt. St. Helens (extensive ash plume affected us)		Columbus Day Storm 1962, other smaller windstorms since	about once in 10 years - Winter 2008 most recently

Number	Drought	Flood	Earthquake	Landslide / Debris Flow	Volcanic Eruption	Wildfire	Wind Storm	Severe Winter Storm
8		1994 Silver Creek reached flood levels and threatened low lying city areas	1991 quake centered in Mt Angel created some damage to buildings				Periodic high winter winds create tree damage and danger of falling debris	2008 and 2005 snow and ice created hazards with breaking trees and ice on roadways, electric outage
9		1996 evacuation of nursing homes	1992 caused chemical spill at area wal mart, multiple injuries		1980 Ash fallout, respiratory problems and transportation disruption	recent years wildfire threatened silverton area, possible evacuation	common, often dirupts communication and roads	common, often dirupts communication and roads
10		1996/minor evacuation						2008/snow and ice removal to provide access to local hospital

Does your organization have a plan in place to respond to / recover from natural disasters?

Answer Options	Response Frequency	Response Count
Yes	58.3%	7
No	41.7%	5
Don't know	0.0%	0
answered question		12
skipped question		0

Any interested persons, groups and/or organizations can assist in building the community's resilience to natural hazards. For example, neighborhood groups can teach residents in forested areas about how to reduce risk from wildfires by installing metal roofs or eliminating combustible materials around buildings. Is your organization able and/or willing to assist with any of the following? Please check all that apply.

Answer Options	Response Frequency	Response Count
Education and outreach	77.8%	7
Information dissemination	88.9%	8
Plan/project implementation	55.6%	5
Other (please specify)		4
	answered question	9
	skipped question	3

Number	Other (please specify)
1	We are already involved.
2	OUR MEMBERSHIP (39) INCLUDES MOSTLY PEOP;E DEDICATED TO SERVING THE COMMUNITY IN WHATEVER WAY THEY CAN. OUR EDUCATION PROFILE RANGES FROM HIGH SCHOOL TO MULTIPLE DEGREES PLUS A HUGE RESERVOIR OF "LIFE EXPERIENCE" PHD'S, INCLUDING ONE RETIRED NAVY COMMANDER WITH 30 YEARS EXPERIENCE IN AVIATION AND EXECUTIVE ENDEAVORS.
3	The hospital partners with local government in disaster planning
4	As an individual I personally completed disaster training 5 years ago

Natural hazard mitigation is the act of reducing or eliminating future loss of life, property, or injuries resulting from hazards through short term and long-term activities. Mitigation actions can be grouped into the following six categories. Please tell us how important each one is to you.						
Answer Options	**Very Important**	**Somewhat Important**	**Neither Important nor Unimportant**	**Not Very Important**	**Not Important**	**Response Count**
Prevention (Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built)	4	5	0	0	0	9
Property Protection (Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area)	3	5	1	0	0	9
Public Education & Awareness (Actions to inform and educate citizens, elected officials and property owners about hazards and mitigation strategies)	9	1	0	0	0	10
Natural Resource Protection (Actions that minimize hazard losses and also preserve or restore the functions of natural systems.)	3	5	1	0	0	9
Emergency Services (Actions that protect people and property during and immediately after a disaster or hazard event)	9	1	0	0	0	10
Structural Projects (Actions that involve the construction of structures to reduce the impact of a hazard.)	3	5	1	0	0	9
					answered question	**10**
					skipped question	**2**

Please provide examples of mitigation activities that you would like to see implemented within your community.	
Answer Options	**Response Count**
	6
answered question	**6**
skipped question	**6**

Number	Response Text
1	To develop a emergency plan within the community. Have it tested several times so people are used to it. We have a loud bell that rings at noon. Maybe that could be used to notify people of evacuation or other measures.
2	Business preparedness plans. Evacuation routes/plans - for fires, earthquakes, etc. Plan for bridge failure - we have two that link the core of town to the hospital. (temp bridge - alt. routes) Communication plan - who notifies, who gets info, how to get on the list, etc.
3	I AM NOT CONVERSENT WITH CURRENT PLANS, THAT SAID MY CONCERNS MAY HAVE ALREADY BEEN MET, HOWEVER, ASSUMNG MY CONCERNS HAVE NOT BEEN DEALT WITH, I AM CONCERNED ABOUT: 1) RESCUE OR CARE OF THE LARGE COMMUNITY OF ELDERLY IN THE AREA. IN CASE OF FIRE ON A LARGE SCALE, HOW WILL THESE PEOPLE BE HELPED TO EVACUATE? 2) WHERE WILL THEY BE HOUSED AND HOW WILL THEY BE FED? THERE ARE MANY WIDOWS LIVING ALONE IN SILVERTON. 3) FAILURE OF THE DAM HOLDNG THE SILVERTON RESERVOIR WILL CREATE TREMENDOUS NEED. IF POSSIBLE, EXTENSIVE PREPARATION FOR THE EVENT NEEDS TO BE DONE.
4	Better public awareness of issues through education and outreach.
5	health check of neighborhood standing trees, especially oaks. continual monitoring of dam at City reservoir annual review training for people trained in emergency support early warning system on reservoir if a failure City to acquire snow removal equipment for major roadways. Downtown area building inspection for earthquake resistance possible under-grounding of electric/phone lines for winter storms continued improvement of sewer waist lines for efficient removal
6	continued development of CERT teams to ease the load on emergency services following a disaster. Identifaction of major transportation routes for use during emergencies and a plan to keep them open. A messaging system for 911 center to call out to community members with instruction/information. Move toward buried utilities to eliminate problems with lines down across roads, power disruptions.

Would you like to be contacted in the future to review plan drafts?		
Answer Options	**Response Frequency**	**Response Count**
Yes	80.0%	8
No	20.0%	2
answered question		**10**
skipped question		**2**

Is there any additional information you would like to provide?	
Answer Options	**Response Count**
	3
answered question	**3**
skipped question	**9**

Number	Response Text
1	We also have a resource coordinator available.
2	MY WIFE AND I ARE AGES 77 & 81. I AM ABLE TO SIT AT A DESK/COMPUTER AND SPEND HOURS "ON DUTY" AS IT WERE. BUT NOT ABLE TO MOVE ABOUT QUICKLY - BARELY ABLE TO BE RESPONSIBLE FOR MYSELF PHYSICALLY.
3	Silverton is actively engaged in disaster planning with multiple agencies and partners. Although Woodburn is not as far along as Silverton, it is making strides toward a comprehensive disaster plan.

Appendix B: Grant Programs

Hazard Mitigation Programs

Post-Disaster Federal Programs

- Hazard Mitigation Grant Program
  - The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.
  - http://www.fema.gov/government/grant/hmgp/
- Physical Disaster Loan Program
  - When physical disaster loans are made to homeowners and businesses following disaster declarations by the U.S. Small Business Administration (SBA), up to 20% of the loan amount can go towards specific measures taken to protect against recurring damage in similar future disasters.
  - http://www.sba.gov/services/disasterassistance/index.html

Pre-Disaster Federal Programs

- Pre-Disaster Mitigation Grant Program
  - The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.
  - http://www.fema.gov/government/grant/pdm/index.shtm
- Flood Mitigation Assistance Program
  - The overall goal of the Flood Mitigation Assistance (FMA) Program is to fund cost-effective measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other National Flood Insurance Program (NFIP) insurable structures. This specifically includes:
    - Reducing the number of repetitively or substantially damaged structures and the associated flood insurance claims;
    - Encouraging long-term, comprehensive hazard mitigation planning;
    - Responding to the needs of communities participating in the NFIP to expand their mitigation activities beyond floodplain development activities; and
    - Complementing other federal and state mitigation programs with similar, long-term mitigation goals.
  - http://www.fema.gov/government/grant/fma/index.shtm

Detailed program and application information for federal post-disaster and pre-disaster programs can be found in the FY10 Hazard Mitigation Assistance Unified Guidance, available at http://www.fema.gov/library/viewRecord.do?id=3649

For Oregon Emergency Management grant guidance on Federal Hazard Mitigation Assistance, visit: http://www.oregon.gov/OMD/OEM/plans_train/grant_info/hma.pdf

OEM contact: Dennis Sigrist, dsigrist@oem.state.or.us

State Programs

- Community Development Block Grant Program
  - Promotes viable communities by providing: 1) decent housing; 2) quality living environments; and 3) economic opportunities, especially for low and moderate income persons. Eligible Activities Most Relevant to Hazard Mitigation include: acquisition of property for public purposes; construction/reconstruction of public infrastructure; community planning activities. Under special circumstances, CDBG funds also can be used to meet urgent community development needs arising in the last 18 months which pose immediate threats to health and welfare.
  - http://www.hud.gov/offices/cpd/communitydevelopment/programs/
- Oregon Watershed Enhancement Board
  - While OWEB's primary responsibilities are implementing projects addressing coastal salmon restoration and improving water quality statewide, these projects can sometimes also benefit efforts to reduce flood and landslide hazards. In addition, OWEB conducts watershed workshops for landowners, watershed councils, educators, and others, and conducts a biennial conference highlighting watershed efforts statewide. Funding for OWEB programs comes from the general fund, state lottery, timber tax revenues, license plate revenues, angling license fees, and other sources. OWEB awards approximately $20 million in funding annually.
  - http://www.oweb.state.or.us/

Federal Mitigation Programs, Activities & Initiatives

Basic & Applied Research/Development

- National Earthquake Hazard Reduction Program (NEHRP), National Science Foundation. Through broad based participation, the NEHRP attempts to mitigate the effects of earthquakes. Member agencies in NEHRP are the US Geological Survey (USGS), the National Science Foundation (NSF), the Federal Emergency Management Agency (FEMA), and the National Institute for Standards and Technology (NIST). The agencies focus on research and development in areas such as the science of earthquakes, earthquake performance of buildings and other structures, societal impacts, and emergency response and recovery. http://www.nehrp.gov/

- Decision, Risk, and Management Science Program, National Science Foundation. Supports scientific research directed at increasing the understanding and effectiveness of decision making by individuals, groups, organizations, and society. Disciplinary and interdisciplinary research, doctoral dissertation research, and workshops are funded in the areas of judgment and decision making; decision analysis and decision aids; risk analysis, perception, and communication; societal and public policy decision making; management science and organizational design. The program also supports small grants for exploratory research of a time-critical or high-risk, potentially transformative nature.
  http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&org=SES

Hazard ID and Mapping

- National Flood Insurance Program: Flood Mapping; FEMA. Flood insurance rate maps and flood plain management maps for all NFIP communities. http://www.fema.gov/plan/prevent/fhm/index.shtm
- National Digital Orthophoto Program, DOI – USGS. Develops topographic quadrangles for use in mapping of flood and other hazards. http://www.ndop.gov/
- Mapping Standards Support, DOI-USGS. Expertise in mapping and digital data standards to support the National Flood Insurance Program. http://ncgmp.usgs.gov/ncgmpstandards/
- Soil Survey, USDA-NRCS. Maintains soil surveys of counties or other areas to assist with farming, conservation, mitigation or related purposes. http://soils.usda.gov/survey/

Project Support

- Coastal Zone Management Program, NOAA. Provides grants for planning and implementation of non-structural coastal flood and hurricane hazard mitigation projects and coastal wetlands restoration. http://coastalmanagement.noaa.gov/
- Community Development Block Grant Entitlement Communities Program, HUD. Provides grants to entitled cities and urban counties to develop viable communities (e.g., decent housing, a suitable living environment, expanded economic opportunities), principally for low- and moderate- in come persons. http://www.hud.gov/offices/cpd/communitydevelopment/programs/entitlement/
- National Fire Plan (DOI – USDA) Provides technical, financial, and resource guidance and support for wildland fire management across the United States. Addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. http://www.forestsandrangelands.gov/NFP/index.shtml
- Assistance to Firefighters Grant Program, FEMA. Grants are awarded to fire departments to enhance their ability to protect the public and fire service personnel from fire and related hazards. Three types of grants are available: Assistance to Firefighters Grant (AFG), Fire Prevention and Safety (FP&S), and Staffing for Adequate Fire and Emergency Response (SAFER). http://www.firegrantsupport.com/
- Emergency Watershed Protection Program, USDA-NRCS. Provides technical and financial assistance for relief from imminent hazards in small watersheds, and to reduce vulnerability of life and property in small watershed areas damaged by severe natural hazard events. http://www.nrcs.usda.gov/programs/EWP/
- Rural Development Assistance – Utilities, USDA. Direct and guaranteed rural economic loans and business enterprise grants to address utility issues and development needs. http://www.usda.gov/rus/
- Rural Development Assistance – Housing, USDA. Grants, loans, and technical assistance in addressing rehabilitation, health and safety needs in primarily low-income rural areas. Declaration of major disaster necessary. http://www.rurdev.usda.gov/rhs/
- Public Assistance Grant Program, FEMA. The objective of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Grant Program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President. http://www.fema.gov/government/grant/pa/index.shtm

- National Flood Insurance Program, FEMA. Makes available flood insurance to residents of communities that adopt and enforce minimum floodplain management requirements. http://www.fema.gov/business/nfip/
- HOME Investments Partnerships Program, HUD. Grants to states, local government and consortia for permanent and transitional housing (including support for property acquisition and rehabilitation) for low-income persons. http://www.hud.gov/offices/cpd/affordablehousing/programs/home/
- Disaster Recovery Initiative, HUD. Grants to fund gaps in available recovery assistance after disasters (including mitigation). http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/driquickfacts.cfm
- Emergency Management Performance Grants, FEMA. Helps state and local governments to sustain and enhance their all-hazards emergency management programs. http://www.fema.gov/government/grant/empg/index.shtm#0
- Partners for Fish and Wildlife, DOI – FWS. Financial and technical assistance to private landowners interested in pursuing restoration projects affecting wetlands and riparian habitats. http://www.fws.gov/partners/
- North American Wetland Conservation Fund, DOI-FWS. Cost-share grants to stimulate public/private partnerships for the protection, restoration, and management of wetland habitats. http://www.doi.gov/partnerships/wetlands.html
- Federal Land Transfer / Federal Land to Parks Program, DOI-NPS. Identifies, assesses, and transfers available Federal real property for acquisition for State and local parks and recreation, such as open space. http://www.nps.gov/ncrc/programs/flp/flp_questions.html
- Wetlands Reserve program, USDA-NCRS. Financial and technical assistance to protect and restore wetlands through easements and restoration agreements. http://www.nrcs.usda.gov/Programs/WRP/

More resources at: http://www.oregonshowcase.org/stateplan/part4
(Click on Appendix 5 of the State's Enhanced Natural Hazard Mitigation Plan: Hazard Mitigation Funding Programs)

Appendix C: Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center. It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police – Office of Emergency Management, 2000), and Federal Emergency Management Agency Publication 331, *Report on Costs and Benefits of Natural Hazard Mitigation*. This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to evaluate local projects. It is intended to (1) raise benefit/cost analysis as an important issue, and (2) provide some background on how economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value, from a public policy perspective, in assessing the positive and negative impacts from mitigation

activities, and obtaining an instructive benefit/cost comparison. Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

What are some Economic Analysis Approaches for Evaluating Mitigation Strategies?

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into three general categories: benefit/cost analysis, cost-effectiveness analysis and the STAPLE/E approach. The distinction between the three methods is outlined below:

Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by the state Office of Emergency Management (OEM), the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoiding future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project must have a benefit/cost ratio greater than 1 (i.e., the net benefits will exceed the net costs) to be eligible for FEMA funding.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in Public Sector Mitigation Activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions which involve a diverse set of beneficiaries and non-market benefits.

Investing in Private Sector Mitigation Activities

Private sector mitigation projects may occur on the basis of one or two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies;
2. Dispose of the building or land either by sale or demolition;
3. Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
4. Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative.

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchases. Correcting deficiencies can be expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

STAPLE/E Approach

Considering detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practical. There are some alternate approaches for conducting a quick evaluation of the proposed mitigation activities which could be used to identify those mitigation activities that merit more detailed assessment. One of those methods is the STAPLE/E approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a synthetic fashion. This set of criteria requires the committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The second chapter in FEMA's How-To Guide "Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies" as well as the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process" outline some specific considerations in analyzing each aspect. The following are suggestions for how to examine each aspect of the STAPLE/E approach from the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process."

Social: Community development staff, local non-profit organizations, or a local planning board can help answer these questions.

- Is the proposed action socially acceptable to the community?
- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical: The city or county public works staff, and building department staff can help answer these questions.

- Will the proposed action work?
- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community goals?

Administrative: Elected officials or the city or county administrator, can help answer these questions.

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political: Consult the mayor, city council or county planning commission, city or county administrator, and local planning commissions to help answer these questions.

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal: Include legal counsel, land use planners, risk managers, and city council or county planning commission members, among others, in this discussion.

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the comprehensive plan, or must the comprehensive plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic: Community economic development staff, civil engineers, building department staff, and the assessor's office can help answer these questions.

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private?)
- How will this action affect the fiscal capability of the community?

- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?
- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide? (This can include dollar amount of damages prevented, number of homes protected, credit under the CRS, potential for funding under the HMGP or the FMA program, etc.)

Environmental: Watershed councils, environmental groups, land use planners and natural resource managers can help answer these questions.

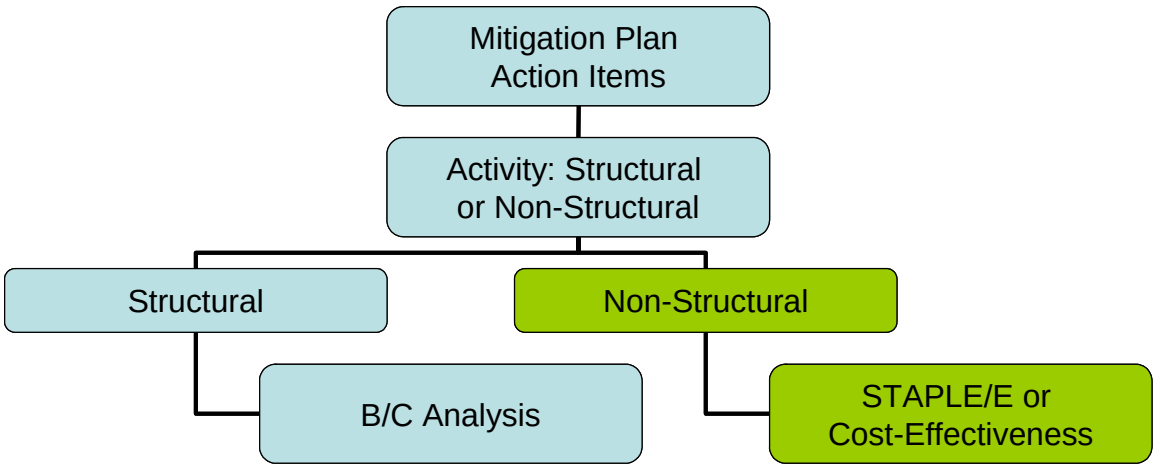
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

The STAPLE/E approach is helpful for doing a quick analysis of mitigation projects. Most projects that seek federal funding and others often require more detailed benefit/cost analyses.

When to use the Various Approaches

It is important to realize that various funding sources require different types of economic analyses. The following figure is to serve as a guideline for when to use the various approaches.

Figure A.1: Economic Analysis Flowchart



Source: Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center, 2005

Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating mitigation activities is outlined below. This framework should be used in further analyzing the feasibility of prioritized mitigation activities.

1. Identify the Activities

Activities for reducing risk from natural hazards can include structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation projects can assist in minimizing risk to natural hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate activities. Potential economic criteria to evaluate alternatives include:

- ***Determine the project cost***. This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- ***Estimate the benefits***. Projecting the benefits, or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.
- ***Consider costs and benefits to society and the environment***. These are not easily measured, but can be assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- ***Determine the correct discount rate***. Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

Once costs and benefits have been quantified, economic analysis tools can rank the possible mitigation activities. Two methods for determining the

best activities given varying costs and benefits include net present value and internal rate of return.

- ***Net present value***. Net present value is the value of the expected future returns of an investment minus the value of the expected future cost expressed in today's dollars. If the net present value is greater than the projected costs, the project may be determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- ***Internal rate of return***. Using the internal rate of return method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

The estimation of economic returns, which accrue to building or land owners as a result of natural hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- Building damages avoided
- Content damages avoided
- Inventory damages avoided
- Rental income losses avoided
- Relocation and disruption expenses avoided
- Proprietor's income losses avoided

These parameters can be estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment can be important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Natural Hazards

Property owners should also assess changes in a broader set of factors that can change as a result of a large natural disaster. These are usually termed "indirect" effects, but they can have a very direct effect on the economic

value of the owner's building or land. They can be positive or negative, and include changes in the following:

- Commodity and resource prices
- Availability of resource supplies
- Commodity and resource demand changes
- Building and land values
- Capital availability and interest rates
- Availability of labor
- Economic structure
- Infrastructure
- Regional exports and imports
- Local, state, and national regulations and policies
- Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from natural hazards. Economic analysis can also save time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that can assist in conducting an economic analysis for natural hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. With this in mind, opportunity rises to develop strategies that integrate natural hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating natural hazard mitigation with other community projects can increase the viability of project implementation.

Resources

CUREe Kajima Project, *Methodologies for Evaluating the Socio-Economic Consequences of Large Earthquakes*, Task 7.2 Economic Impact Analysis, Prepared by University of California, Berkeley Team, Robert A. Olson, VSP Associates, Team Leader; John M. Eidinger, G&E Engineering Systems; Kenneth A. Goettel, Goettel and Associates, Inc.; and Gerald L. Horner, Hazard Mitigation Economics Inc., 1997

Federal Emergency Management Agency, *Benefit/Cost Analysis of Hazard Mitigation Projects*, Riverine Flood, Version 1.05, Hazard Mitigation Economics, Inc., 1996

Federal Emergency Management Agency, *Report on the Costs and Benefits of Natural Hazard Mitigation*. Publication 331, 1996.

Goettel & Horner Inc., *Earthquake Risk Analysis Volume III: The Economic Feasibility of Seismic Rehabilitation of Buildings in the City of Portland*, Submitted to the Bureau of Buildings, City of Portland, August 30, 1995.

Goettel & Horner Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects* Volume V, Earthquakes, Prepared for FEMA's Hazard Mitigation Branch, Ocbober 25, 1995.

Horner, Gerald, *Benefit/Cost Methodologies for Use in Evaluating the Cost Effectiveness of Proposed Hazard Mitigation Measures*, Robert Olsen Associates, Prepared for Oregon State Police, Office of Emergency Management, July 1999.

Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police – Office of Emergency Management, 2000.)

Risk Management Solutions, Inc., *Development of a Standardized Earthquake Loss Estimation Methodology*, National Institute of Building Sciences, Volume I and II, 1994.

VSP Associates, Inc., *A Benefit/Cost Model for the Seismic Rehabilitation of Buildings*, Volumes 1 & 2, Federal Emergency management Agency, FEMA Publication Numbers 227 and 228, 1991.

VSP Associates, Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects: Section 404 Hazard Mitigation Program and Section 406 Public Assistance Program, Volume 3: Seismic Hazard Mitigation Projects*, 1993.

VSP Associates, Inc., *Seismic Rehabilitation of Federal Buildings: A Benefit/Cost Model*, Volume 1, Federal Emergency Management Agency, FEMA Publication Number 255, 1994.

Appendix D:
Action Item Worksheets

Drought # 1*

Proposed Action Item:	**Alignment with Plan Goals:**
Update the current water conservation management plan and educate the public on water supply systems.	*Goal 1: Public Awareness* *Goal 2: Education* *Goal 6: Natural Resources Utilization*

Rationale for Proposed Action Item:

The water conservation management plan provides measures for water conservation in Silverton during dry periods. Updating the water conservation management plan to meet current water needs will prevent water shortages in Silverton during drought periods.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the impact of hazards on a community [201.6(c)(3)(ii)]. Updating the current water conservation management plan, and educating the public on water supply systems, will reduce the likelihood of water shortages during dry periods and provide the public with an understanding of Silverton's water supply systems.

Ideas for Implementation:

Update water conservation management plan.

Educate the public on the importance of Silverton Reservoir as an integral part of the water system via Open House, Flyers, and Website

Coordinating Organization:	Silverton Public Works

Internal Partners:	**External Partners:**
Community Development	State Water Resources

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
2 years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Earthquake #1*

Proposed Action Item:	**Alignment with Plan Goals:**
Seek voter approval for construction of City of Silverton Police Facility/Emergency Operations Center	*Goal 3: Preventative* *Goal 4: Funding and Implementation* *Goal 7: Emergency Services*

Rationale for Proposed Action Item:

According to Silverton's risk assessment, the city has a high probability and high vulnerability to earthquakes, and a high probability and moderate vulnerability to floods. The existing Silverton Police Department facility is located in City Hall which was constructed in 1925. The building is not earthquake resistant and is very likely to collapse in the event of an earthquake. It is also located along Silver Creek in the flood inundation zone. The existing City Emergency Operations Center is a small room at the Sewer Plant and is not well suited for emergency operations command and control. In addition, the existing police facility has no room for training and has inadequate space for conducting emergency operations in the event of a natural disaster.

Seeking voter approval to construct a new police facility with space for a combined training area/emergency operations center will help reduce the city's vulnerability to earthquake and flood hazards and allow the city to continue essential emergency services. The City of Silverton is confident they can bring this issue to the voters for a vote in the next five years and have a reasonable expectation for success.

Ideas for Implementation:

Plan for a ballot measure in May, 2010 to ask the voters to support a tax increase to fund a new police department facility that would include an emergency operations center.

Apply for Department of Homeland Security grant funds and seek Congressional assistance for funds to construct the emergency operations center portion of the new police department facility, including adequate backup power.

Construct the new police facility in area that is not vulnerable to flooding, and in such a manner as to reduce the risk of damage from an earthquake**.**

Coordinating Organization:	Silverton Police Department

Internal Partners:	**External Partners:**
City of Silverton and Silverton City Council	"Yes On" Committee; U.S. Department of Homeland Security; Congressional delegation

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	$8 to $10 million
2 years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Earthquake #2*

Proposed Action Item:	**Alignment with Plan Goals:**
Coordinate with Marion County to assess the seismic stability of the three bridges that cross Silver Creek and seek funding to reinforce or replace as needed (also applies to flooding concerns).	*Goal 3: Preventative* *Goal 4: Funding and Implementation* *Goal 5: Partnerships and Coordination.*

Rationale for Proposed Action Item:

The Silverton Steering Committee identified the three bridges that cross Silver Creek as potentially vulnerable to seismic activity. Should these bridges collapse in an earthquake, access across Silver Creek will be compromised, isolating large portions of the community and limiting access to emergency services and basic supplies. Marion County would also be limited in providing necessary services to areas east of Silver Creek. Coordinating efforts with Marion County to assess the seismic stability of the three bridges and seeking funding to reinforce or replace as needed will provide both Silverton and Marion County with necessary access across Silver Creek and provide continuous service in both communities. Coordination with Marion County will also increase efficiency by reducing redundancy.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. The three bridges that cross Silver Creek provide necessary access to areas in Silverton and Marion County. Coordinating with Marion County to assess the seismic stability of the three Silver Creek bridges, and replacing them as necessary, will ensure a viable transportation system and provide continuous service to Silverton and Marion County residents.

Ideas for Implementation:

Work with Marion County to conduct seismic assessment of the three bridges crossing Silver Creek. Prioritize any actions that need to be taken to address any seismic concerns and coordinate with Marion County, ODOT, and the OEM seismic grants coordinator to find appropriate funding sources.

Coordinate with Marion County on assessing and potentially retrofitting the C Street Bridge, which is a major arterial in Silverton.

Coordinating Organization:	Silverton Public Works

Internal Partners:	**External Partners:**
Silverton Planning	Marion County, ODOT

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
2 years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Earthquake #3

Proposed Action Item:	**Alignment with Plan Goals:**
Assess the seismic strength of Silverton's sewage treatment system and develop improvements accordingly as part of the sewage system's current update efforts.	*Goal 3: Preventative*

Rationale for Proposed Action Item:

The Silverton Steering Committee identified that the sewage treatment plant could be vulnerable to seismic activity. If damaged, the treatment plant could release raw sewage into Silver Creek, the city's water source. In addition, the City of Silverton's risk assessment notes that Silverton has a high probability of an earthquake recurring and a high vulnerability to earthquake events. Currently, the sewage treatment plant is in the process of being updated. As a part of this update, the seismic strength of Silverton's sewage treatment system should be assessed and improvements should be developed accordingly to reduce the city's vulnerability to seismic hazards.

The Disaster Mitigation Act of 2000 requires communities to identify actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Accurately assessing the seismic strength of the sewage treatment plant and developing improvements to it would reduce or avoid completely any damage to critical infrastructure.

Ideas for Implementation:

Include a seismic assessment of the sewage treatment plant as part of the current update process.

Contract with an engineer to assess and produce a report for the sewage treatment plant.

Seek funding from FEMA to develop seismic improvements of the Silverton sewage treatment plant, if needed.

Coordinating Organization:	Silverton Public Works

Internal Partners:	**External Partners:**
Silverton Building Inspector	Oregon DEQ, State Water Resources, Army Corps of Engineers, FEMA, OEM

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Earthquake #4

Proposed Action Item:	**Alignment with Plan Goals:**
Coordinate with Silverton School District to seek funding to assess and seismically retrofit school buildings that are vulnerable to collapse, including Mark Twain Middle School, the Robert Frost Elementary School and the Eugene Field Elementary School.	*Goal 3: Preventative* *Goal 4: Funding and Implementation* *Goal 5: Partnerships and Coordination*

Rationale for Proposed Action Item:

In 2007, the Department of Geology and Mineral Industries (DOGAMI) conducted a seismic needs assessment for public school buildings, acute inpatient care facilities, fire stations, police stations, sheriffs' offices, and other law enforcement agency buildings.[1] Buildings were ranked for the "probability of collapse" due to the maximum possible earthquake for any given area. Within the city of Silverton, the following buildings were given a "high" or "very high" probability of collapse rating:

- Mark Twain Middle School: *high (> 10%)*
- Robert Frost Elementary School: *high (> 10%)*
- Eugene Field Elementary School: *high (> 10%)*
- Silverton High School (Schlador St. Campus): *very high (100%)*
    - Note*:* a new high school is currently under construction, and will replace the Schlador St. Campus building

Assessing the "probability of collapse" for these school buildings and conducting seismic retrofits will reduce the vulnerability of these buildings by preventing damage to life and property.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Assessing the "probability of collapse" for these school buildings and seismically retrofitting them will reduce their vulnerability by preventing damage to life and property.

Ideas for Implementation:

Further assess those buildings rated at a "high" risk of collapse. Prioritize any actions that need to be taken to address any seismic concerns and coordinate with Silverton School District and OEM seismic grants coordinator to find appropriate funding sources.

Publicize and improve awareness of the earthquake risk using existing education and outreach efforts.

Use FEMA's procedures document for developing scopes of work for seismic structural and non-structural retrofit projects.

Coordinating Organization:	Silver Falls School District

Internal Partners:	**External Partners:**
Silverton Building Inspector	FEMA, OEM, DOGAMI

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	(Silver Falls School District has estimates)
	Long Term	

Form Submitted by:	Silverton Steering Committee

[1] McConnell, Vicki S. Department of Geology and Mineral Industries. *Statewide Seismic Needs Assessment: Implementation of Oregon 2005 Senate Bill 2 Relating to Public Safety, Earthquakes, and Seismic Rehabilitation of Public Buildings."* 2007. http://www.oregongeology.com/sub/projects/rvs/OFR-O07-02-SNAA-onscreen.pdf.

Action Item Status: New Action (2009)

Earthquake #5

Proposed Action Item:	**Alignment with Plan Goals:**
Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education	*Goal 1: Public Awareness* *Goal 2: Education* *Goal 3: Preventative*

Rationale for Proposed Action Item:

Seismic hazards pose a real and serious threat to many communities in Oregon, requiring local governments, planners, and engineers to consider their community's safety. Earthquake damage occurs because we have built structures that cannot withstand severe shaking. Buildings, ports, and lifelines (highways, telephone lines, gas, water, etc.) suffer damage in earthquakes. Damage and loss of life can be very severe if structures are not designed to withstand shaking, are on ground that amplifies shaking, or ground which liquefies due to shaking.[2]

Nonstructural retrofits protect building contents with little cost and effort. Examples of retrofits include:

- Securing water heaters, large appliances, bookcases, pictures and bulletin boards;
- Latching cabinet doors; and
- Using safety film on windows.

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Encouraging reduction of nonstructural and structural earthquake hazards will prevent damage to existing buildings and infrastructure.

Ideas for Implementation:

Develop informational brochures about individual mitigation opportunities and post on the city's website, include in the water bill, and make available on the front counters at the police and public works departments. Include recommendations regarding non-structural retrofits in these brochures. Use the following modes of communication or events to educate the public: Quarterly Newsletter, Website, Flyers, National Night Out, Safety Fair

Distribute a "Homeowner's Guide to Non-Structural Retrofit" (or something similar) found here: http://www.seattle.gov/DPD/cms/groups/pan/@pan/@emergprep/documents/web_informational/dpds_005877.pdf

Coordinating Organization:	Silverton Administration

Internal Partners:	**External Partners:**
All Silverton Depts.	Silverton Fire Department, Building supply/home improvement businesses, School District, cable station, Chamber of Commerce, Marion County

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

[2] State of Oregon Enhanced Natural Hazards Mitigation Plan, Earthquake Chapter.

Earthquake #6

Proposed Action Item:	**Alignment with Plan Goals:**
Update comprehensive plan to reflect the latest information on seismic hazards.	*Goal 1: Public Awareness* *Goal 3: Preventative*

Rationale for Proposed Action Item:

The city of Silverton's Comprehensive Plan provides the legal framework and long-term vision for implementing plans and land use regulations. Regarding natural hazards, the Comprehensive Plan includes policies that address landslides, floods, and high water tables, but it does not include any information on earthquake hazards. Updating the plan to reflect the latest seismic hazard information will provide a policy framework for addressing the earthquake hazard.

Statewide Planning Goal 2 (Land Use Planning) requires local governments to create comprehensive plans that "shall include identification of issues and problems, inventories, and other factual information for each applicable statewide planning goal…" Furthermore, Goal 7 of Oregon's Land Use Planning Goals requires that local governments "shall adopt comprehensive plans (inventories, policies, and implementing measures) to reduce risk to people and property from natural hazards." Updating Silverton's Comprehensive Plan to address new seismic information will meet Oregon's statewide land use planning goal requirements.

The Risk Assessment section of this mitigation plan estimates that Silverton has a high probability of an earthquake recurring and a high vulnerability to earthquakes. The vulnerabilities identified by the Silverton Steering Committee include potential damage to school buildings, historic and unreinforced masonry buildings, and critical infrastructure such as roads and water pipelines. Updating the comprehensive plan to reflect this new information will establish a policy framework for addressing these issues.

Ideas for Implementation:

Incorporate new earthquake information in the Comprehensive Plan's Periodic Review process.

Review latest vulnerability assessment information and policies that address seismic hazards. Information can be obtained from the risk assessment portion of this mitigation plan and from the Oregon Department of Geology and Mineral Industries (DOGAMI).

Coordinating Organization:	Silverton Community Development

Internal Partners:	**External Partners:**
All Silverton Departments	Silverton Fire Department, Silver Falls School District, Silverton Hospital, Non-profits, churches, etc.

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Earthquake #7

Proposed Action Item:	**Alignment with Plan Goals:**
Evaluate the installation of automatic shut-off valves in all city facilities that use natural gas.	*Goal 3: Preventative* *Goal 5: Partnerships and Coordination*

Rationale for Proposed Action Item:

The city of Silverton uses natural gas in many of its facilities and does not have automatic shut-off valves in these facilities. Installing automatic shut-off valves can prevent natural gas leaks if a gas line is broken in an earthquake, reducing the risk of damage to life and property.

The Risk Assessment section of this mitigation plan estimates Silverton has a high probability of an earthquake recurring. The most recent earthquake that impacted Silverton is the March 1993 Scotts Mills earthquake which damaged unreinforced masonry buildings, including Silverton's City Hall. Another earthquake could cause similar damage to natural gas lines. Automatic shut-off valves could prevent future damage to buildings caused by natural gas leaks.

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Installing automatic shut-off valves in all city facilities that use natural gas can prevent damage to existing buildings and infrastructure by reducing the likelihood of a gas leak.

Ideas for Implementation:

Inventory all natural gas lines in city-owned facilities.

Identify manufacturers of automatic natural gas shut-off valves and investigate whether they are appropriate technologies for the city of Silverton.

Coordinate with Northwest Natural to estimate the number and the cost of purchasing automatic shut-off valves.

Use FEMA's procedures document for developing scopes of work for seismic structural and non-structural retrofit projects.

Coordinating Organization:	Silverton Public Works

Internal Partners:	**External Partners:**
Building Inspector	Silverton Fire Department, Northwest Natural

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Flood #1*

Proposed Action Item:	**Alignment with Plan Goals:**
Consult with Oregon Emergency Management to develop flood mitigation actions to address flooding hazards along Silver Creek between James Street and C Street.	*Goal 1: Public Awareness* *Goal 2: Education* *Goal 3: Preventative* *Goal 5:Partnerships and Coordination*

Rationale for Proposed Action Item:

The Silverton Steering Committee said that during even minor flood events, the parking lot and the nursing home operated by Marquis Care Homes on James Avenue, and the apartment complex southeast of the nursing home on Silver Street, are at risk to flooding. The nursing home parking lot is at elevation 228.2 and the building floor at approximately 229. In this area, the 100 year flood elevation is approximately 231.0. In addition flood waters reaching the parking lot will flow around the nursing home building reaching James avenue and then flow down Silver Street causing more homes to be in jeopardy. Several basements were flooded in this area during the 1996 floods. This neighborhood contains a number of vulnerable populations, including elderly patients and young children. Flood mitigation measures need to be implemented to prevent future flooding damage to the Marquis Care Center and the entire neighborhood, and consulting with OEM on the most appropriate measures will prevent damage to future flooding events.

Potential mitigation measures for this area along Silver Creek include:

- Constructing 600 feet of permanent floodwall between the railroad bridge and James Avenue Bridge. A wall of approximately 3 feet height would provide approximately 0.2 feet of freeboard in a 100 year flood event, however this action may not be eligible for Pre-Disaster Mitigation funding because the floodwall does not protect a critical facility.
- Raise the existing buildings above the base flood level.
- Acquire and relocate buildings in the floodplain.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Developing appropriate mitigation measures in coordination with OEM will reduce the impact of floods on existing buildings in the floodplain and reduce the likelihood of future costly evacuations among the elderly.

Ideas for Implementation:

- Consult with OEM, FEMA, and DLCD on the appropriate and most cost-effective flood mitigation project for this area.
- Conduct a cost benefit analysis for flood mitigation projects along James Street.
- Coordinate activities with the Marquis Care Homes and residents along James, Brook, Willow, Alder, and Silver Streets.
- Apply for a FEMA grant for partial funding and assess the nursing home and apartments for a proportional share and use City funds for a match of the remaining amount.

Coordinating Organization:	Public Works

Internal Partners:	**External Partners:**
City Council, Community Planning, Public Works, City Administration	FEMA, OEM, Army Corps of Engineers, James Street neighbors, DLCD

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
2 years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Flood #2

Proposed Action Item:	**Alignment with Plan Goals:**
Develop flood mitigation actions for the waste water treatment facility to prevent damage to the facility and contamination of water resources.	*Goal 3: Preventative*

Rationale for Proposed Action Item:

The Silverton waste water treatment plant is located in the 100-year floodplain along Silver Creek. The Silverton Steering Committee noted that if damaged by flood events, the treatment plant could release raw sewage into Silver Creek. In addition, the city of Silverton's risk assessment notes that Silverton has a high probability of a flood recurring and a moderate vulnerability to floods. Currently, the sewage treatment plant is in the process of being updated. As a part of this update, flood mitigation actions for Silverton's sewage treatment system should be included in any improvements to reduce the plant's vulnerability to flood hazards. Consulting with OEM will help to develop appropriate flood mitigation action items.

Potential eligible mitigation actions to consider include:

- Constructing a floodwall near the sewage treatment plant. This action is eligible for Pre-Disaster Mitigation funding because the floodwall will protect a critical facility and it is not part of a larger flood control system.
- Raise critical facilities above the base flood level.
- Relocate buildings in the floodplain.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Developing flood mitigation actions for the waste water treatment facility will prevent damage to the facility and contamination of water resources.

Ideas for Implementation:

Include flood mitigation as part of existing waste water treatment facility work.

Consult with Oregon Emergency Management, FEMA, and the Army Corps of Engineers to develop appropriate flood mitigation actions.

Coordinating Organization:	Silverton Public Works

Internal Partners:	**External Partners:**
Community Development	OEM, FEMA, Army Corps of Engineers, DLCD

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Flood #3*

Proposed Action Item:	**Alignment with Plan Goals:**
Implement the mitigation action items listed in the Silver Creek Dam Emergency Action Plan.	*Goal 1: Public Awareness* *Goal 3: Preventative* *Goal 5: Partnerships and Coordination* *Goal 7: Emergency Services*

Rationale for Proposed Action Item:

The Silver Creek Dam Emergency Action Plan (EAP) provides mitigation, preparedness, response, and recovery measures to prevent the loss of life and property in Silverton in the unlikely event that the Silver Creek Dam should fail. While intense rains, earthquakes, landslides, and volcanic eruptions could cause the dam to overflow, these events are extremely unlikely. To prevent the dam from overflowing, the EAP includes the following mitigation actions:

- Monitoring the US Weather Service for flood warnings in the Silver Creek basin.
- Monitoring the Oregon Department of Geology and Mineral Industries (DOGAMI) for reports of earthquakes within 50 miles of the dam site.
- Responding to any credible report of potential problems or issues with the dam.
- Performing routine visual inspections of the dam.

Implementing these mitigation actions will reduce the likelihood that the Silver Creek Dam should fail.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that address new buildings and infrastructure [201.6(c)(3)(ii)]. Implementing the mitigation actions found in the Silver Creek Dam EAP will reduce the likelihood that the Silver Creek Dam will fail.

Ideas for Implementation:

Review Dam Early Warning System Plan and Dam Safety Action Plan to identify short and long-term action plans that identify feasible project that can be completed in 1-2 years and long range improvements that will improve the safety of the dam.

Identify public outreach and educational opportunities that improve citizen understanding of likely failure scenarios, improve citizen response to those scenarios, and provide current information on the dam to citizens on a regular basis. This would include access to dam information via the city's website, annual notices to those living in the inundation zone regarding results of annual inspections, and evacuation routes.

Provide staff training on response to dam failure, including table top exercises, mapping, identification of partner agencies in the event of dam failure.

Coordinating Organization:	Silverton Administration

Internal Partners:	**External Partners:**
Public Works, Community Planning, City Council	State Water Resources, Army Corps of Engineers

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	$500,000-$1,000,000
2 years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Flood #4

Proposed Action Item:	**Alignment with Plan Goals:**
Explore steps needed to qualify Silverton for participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS).	*Goal 1: Public Awareness* *Goal 2:Education*

Rationale for Proposed Action Item:

The Community Rating System (CRS) is operated under the National Flood Insurance Program (NFIP). The NFIP provides flood insurance to homes and businesses located in floodplains at a reasonable cost, and encourages the movement of development away from the floodplain. The program is based upon mapping areas of flood risk, and requiring local implementation to reduce that risk, primarily through restrictions on new development in floodplains. CRS recognizes community efforts that go beyond the minimum standards of the NFIP. This recognition is in the form of reduced flood insurance premiums for communities that adopt such standards. CRS encourages community activities that reduce flood losses, facilitate accurate insurance rating, and promote flood insurance awareness[3].

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Joining the CRS program will further protect existing buildings in Silverton from flooding events by mitigating homes beyond the minimum standards of the NFIP.

Ideas for Implementation:

Visit CRS website to find out specifics on what Silverton can do to improve their CRS rating.
CRS website: http://training.fema.gov/EMIWeb/CRS/. Example actions include: relocating structures in the floodplain, maintaining drainage systems, preserving open space, mapping areas not on a FIRM.

Determine whether becoming member of the CRS is cost-effective.

Coordinating Organization:	Silverton Community Development

Internal Partners:	**External Partners:**
Public Works	FEMA, OEM, CRS Program, Property Owners Impacted

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

[3] Source: Oregon Technical Resource Guide. July 2000. Community Planning Workshop. Eugene, OR: University of Oregon. p. 4-34.

Flood #5

Proposed Action Item:	**Alignment with Plan Goals:**
Continue compliance with the National Flood Insurance Program (NFIP) through the enforcement of local floodplain ordinances	*Goal 1: Public Awareness* *Goal 2: Education* *Goal 3: Preventative*

Rationale for Proposed Action Item:

The National Flood Insurance Program provides communities with federally backed flood insurance to homeowners, renters, and business owners, provided that communities develop and enforce adequate floodplain management ordinances. The benefits of adopting NFIP standards for communities are a reduced level of flood damage in the community and stronger buildings that can withstand floods. According to the NFIP, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance.

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Continued participation in the NFIP will help reduce the level of flood damage to new and existing buildings in communities while providing homeowners, renters and business owners additional flood insurance protection.

Ideas for Implementation:

- Actively participate with DLCD and FEMA during Community Assistance Visits. The Community Assisted Visit (CAV) is a scheduled visit to a community participating in the NFIP for the purpose of 1) conducting a comprehensive assessment of the community's floodplain management program; 2) assisting the community and its staff in understanding the NFIP and its requirements; and 3) assisting the community in implementing effective flood loss reduction measures when program deficiencies or violations are discovered.
- Conduct an assessment of Silverton's floodplain ordinances to ensure they reflect current flood hazards.
- Coordinate with the county to ensure that floodplain ordinances and NFIP regulations are maintained and enforced. Continue to assess the need for updated ordinances.
- Mitigate areas that are prone to flooding and/or have the potential to flood.

Coordinating Organization:	Silverton Community Development

Internal Partners:	**External Partners:**
Planning Commission, City Council	FEMA, Marion County

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Flood #6

Proposed Action Item:	**Alignment with Plan Goals:**
Update the city's Flood Insurance Rate Maps (FIRMs) if funding becomes available.	*Goal 1: Public Awareness* *Goal 2: Education*

Rationale for Proposed Action Item:

The city of Silverton has Flood Mitigation Rate Maps current as of January 2003. However, if funding becomes available, Silverton's FIRMs should be updated to address new information and new vulnerabilities, as well as any new land use developments occurring in the community.

The Disaster Mitigation Act of 2000 requires communities to identify geographic extent of hazards known to impact the community [201.6(c)(2)(i)]. Updated Flood Insurance Rate Maps can assist Silverton in better defining the flood hazard within the community given the development that has taken place since the current FIRMS were created.

Ideas for Implementation:

If there are areas that need to be revised for the flood map, complete the MT-2 Forms Package (Application Forms for Conditional Letters of Map Revision and Letters of Map Revision). The forms and instructions are designed to assist requesters (community officials or individuals via community officials) in gathering the data that the FEMA needs to determine whether the effective NFIP map and Flood Insurance Study report for a community should be revised.

Coordinating Organization:	Silverton Community Development

Internal Partners:	**External Partners:**
Public Works	FEMA, Marion County

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Landslide #1*

Proposed Action Item:	**Alignment with Plan Goals:**
Use newly acquired LIDAR data to determine areas and buildings at risk to landslides and revise comprehensive and land use policies accordingly.	*Goal 1: Public Awareness* *Goal 2: Education*

Rationale for Proposed Action Item:

The city of Silverton participated in the Portland Area LIDAR Consortium which developed LIDAR maps for the Portland metropolitan area. LIDAR is a mapping tool that provides very precise, accurate, and high-resolution images of the surface of the earth, vegetation, and the built environment for use in determining landslide areas, mapping wetlands, and analyzing other geographic features. Silverton's newly acquired LIDAR data can determine areas and buildings at risk to landslides and can inform how the community should revise its comprehensive and land use policies to address new information. Example policies could include development of a landslide hazard overlay zone.

Statewide Planning Goal 2 (Land Use Planning) requires local governments to create comprehensive plans that "shall include identification of issues and problems, inventories, and other factual information for each applicable statewide planning goal…" Furthermore, Goal 7 of Oregon's Land Use Planning Goals requires that local governments "shall adopt comprehensive plans (inventories, policies, and implementing measures) to reduce risk to people and property from natural hazards." Updating Silverton's Comprehensive Plan and land use plans to incorporate new LIDAR information will meet the State's goal requirements.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Using LIDAR data to determine at-risk buildings and infrastructure will significantly reduce the effects of landslides on new and existing developments in hazard-prone areas.

Ideas for Implementation:

Review and analyze LIDAR data and determine the necessary Comprehensive Plan policies and land use policies that are needed to address the landslide hazard.

To inform the community about the landslide hazard, conduct outreach to potentially affected property owners. Outreach methods could include Town Hall meetings or posting information on the website.

Incorporate information during Silverton's required Period Review of the Comprehensive Plan.

Coordinating Organization:	Silverton Community Development

Internal Partners:	**External Partners:**
Silverton Public Works, Silverton Administration, City Council, Planning Commission	DOGAMI, DLCD

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
2 years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Landslide #2*

Proposed Action Item:	**Alignment with Plan Goals:**
Develop a public infrastructure landslide mitigation program to address the landslide hazard using new LIDAR information obtained from DOGAMI.	*Goal 3: Preventative* *Goal 4: Funding and Implementation* *Goal 6: Natural Resources Utilization*

Rationale for Proposed Action Item:

A major factor for controlling landslides is to limit the concentration of storm runoff and in developed areas to prevent runoff from increasing. Identification and interception of existing runoff concentrations would lessen the risk for slides in areas with potential for slide hazards. The landslide mitigation program would analyze all steep slopes that have landslide hazard potential for storm runoff concentrations using the newly developed landslide hazard LIDAR mapping from DOGAMI. The program would develop a plan for new storm drainage improvements to intercept storm water flows before they can create slides. In addition, the program would include standards for new development and infrastructure improvements that would reduce surface runoff concentrations and subsurface water flow from underground utilities.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Developing a public infrastructure landslide mitigation program to address the landslide hazard using new LIDAR information will reduce the impact of landslides on the city of Silverton, protecting new and existing buildings.

Ideas for Implementation:

As part of the storm drainage master planning, incorporate additional work for development of a public infrastructure slide hazard mitigation program.

Use DOGAMIs LIDAR mapping information for the city of Silverton to develop accurate landslide hazard maps.

Coordinating Organization:	Silverton Public Works Department

Internal Partners:		**External Partners:**
Silverton Community Development, Silverton Administration, GIS		OEM, DOGAMI
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	$ 30,000
2 years		

Form Submitted by:	Rich Barstad, Public Works Director

Action Item Status: New Action (2009)

Landslide # 3

Proposed Action Item:	**Alignment with Plan Goals:**
Conduct a landslide hazard analysis and risk assessment for the Silverton reservoir to determine the impacts of a landslide event in the reservoir and needed mitigation measures.	*Goal 3: Preventative* *Goal 5: Partnerships and Coordination* *Goal 7: Emergency Services*

Rationale for Proposed Action Item:

Recent LIDAR mapping identified landslide hazards for the area surrounding Silverton Reservoir and Silver Creek Dam. This information needs to be further analyzed to assess the impact of a landslide and the potential for water overtopping the dam should a landslide fall into the reservoir. Hiring a consultant to analyze the landslide risk and developing a risk assessment from this scenario can help to identify further landslide mitigation measures.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Conducting a landslide hazard analysis and risk assessment for the Silverton reservoir will help determine the impacts of a landslide event near the reservoir and needed mitigation measures to prevent the reservoir from overtopping the dam and causing life and property damage downstream.

Ideas for Implementation:

Seek funding from FEMA to assist in the study of the potential for landslides at Silverton Reservoir and develop mitigation measures and resources.

Conduct a geologic analysis to determine the probability of future landslides in the Silverton Reservoir.

Coordinating Organization:	Silverton Public Works

Internal Partners:	**External Partners:**
City of Silverton and Silverton City Council	FEMA, OEM, Consultants

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Rich Barstad, Public Works Director

Action Item Status: New Action (2009)

Wildfire #1

Proposed Action Item:	**Alignment with Plan Goals:**
Implement the wildfire mitigation actions for Silverton found in the Marion County Community Wildfire Protection Plan.	*Goal 1: Public Awareness* *Goal 2: Education* *Goal 3: Preventative* *Goal 4: Funding and Implementation* *Goal 5: Partnerships and Coordination*

Rationale for Proposed Action Item:

The Marion County Community Wildfire Protection Plan identified the city of Silverton as a "Community at Risk" meaning that conditions are conducive to a large-scale fire event and there is a significant threat to human life or property.[4] The Silverton Steering Committee also expressed concern that wildfires beginning on the urban fringe could spread to the city. Finally, Silverton's risk assessment notes that Silverton has a moderate probability to wildfires recurring, but a high vulnerability within the community. Chapter 6 of the Marion County CWPP contains an action plan for the county and communities at risk to reduce the impact of wildfire events. Implementing the wildfire mitigation actions for Silverton will help to reduce the city's vulnerability to wildfires. Example actions found in the CWPP include creating a defensible space, conducting education and outreach about fire prevention, and doing forest fuel reduction.

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Implementing the actions found in the Marion County CWPP will help to protect new and existing buildings from wildfire events.

Ideas for Implementation:

Coordinate with responsible agencies listed in the Marion County CWPP to implement action items. The CWPP's Action Plan is found in Chapter 6. Example actions include creating a defensible space, conducting education and outreach about fire prevention, and doing forest fuel reduction.

Seek funding to help pay for wildfire mitigation projects within Silverton. Potential funding sources can be found in Appendix E of the Marion County CWPP.

Coordinating Organization:	Silverton Fire District

Internal Partners:	**External Partners:**
Silverton Community Development	Oregon Dept. of Forestry, FEMA, OEM, US Forest Service, BLM

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

[4] Marion County Community Wildfire Protection Plan (CWPP), Appendix C.

Wildfire #2

Proposed Action Item:	**Alignment with Plan Goals:**
Review Marion County's development codes together with the Marion County Planning Department to develop ways to mitigate wildfires near Silverton.	*Goal 1: Public Awareness* *Goal 3: Preventative* *Goal 5: Partnerships and Coordination*

Rationale for Proposed Action Item:

The Marion County Community Wildfire Protection Plan identified the city of Silverton as a "Community at Risk" meaning that conditions are conducive to a large-scale fire event and there is a significant threat to human life or property.[5] Furthermore, Silverton's risk assessment notes that Silverton has a moderate probability to wildfires recurring, but a high vulnerability within the community. The Silverton Steering Committee also expressed concern that wildfires beginning in Marion County on the urban fringe could easily spread to the city, and that Marion County's development codes could be strengthened to reduce this risk. Reviewing Marion County's development codes together with the Marion County Planning Department to develop ways to mitigate wildfires will reduce the likelihood that wildfires will spread to the city.

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Reviewing Marion County's development codes together with the Marion County Planning Department to develop ways to mitigate wildfires will reduce the likelihood that wildfires will spread to the city.

Ideas for Implementation:

Review Marion County's development codes together with the Marion County Planning Department to identify potential wildfire issues. Develop strategies for addressing these issues. Strategies could include conducting education and outreach with the public on wildfire risks and mitigation actions.

Coordinate efforts with the Marion County Community Wildfire Protection Plan Steering Committee and Marion County Emergency Management.

Coordinating Organization:	Silverton Fire District

Internal Partners:	**External Partners:**
Silverton Community Development	Marion County Planning, Marion County Building Inspectors and Oregon Department of Forestry, Marion County Emergency Management

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

[5] Marion County Community Wildfire Protection Plan (CWPP), Appendix C.

Wind Storm #1

Proposed Action Item:	**Alignment with Plan Goals:**
Educate the public about the role of proper tree pruning and stability in preventing damage during windstorms.	*Goal 1: Public Awareness* *Goal 2: Education* *Goal 3: Preventative*

Rationale for Proposed Action Item:

High winds can topple trees and break limbs which in turn can result in power outages and disrupt telephone, computer, and TV and radio service, and compromise the functioning of Silverton's utilities such as the wastewater and water treatment plants. While the Public Works and utility companies manage trees in public areas, private property owners are responsible for trees on their property. Educating property owners about how to properly prune their trees to prevent power outages and damage to their property can help reduce impacts of windstorm events.

Silverton has experienced severe wind storm events in the past and is vulnerable to windstorm events. The wind storm risk assessment notes that Silverton's probability of a windstorm recurring is high and the city's vulnerability to windstorm events is also high. Educating the public about the benefits of proper tree pruning and care will help to reduce the city's vulnerability to windstorm events.

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address existing buildings and infrastructure [201.6(c)(3)(ii)]. Educating the public about the benefits of proper tree pruning and care will prevent damage to existing buildings and infrastructure such as power lines.

Ideas for Implementation:

Review regulations and standards for easement and right of way maintenance, and provide training to foresters and logging crews.

Educate homeowners in pruning of vegetation, tree care safety, and proper tree care for trees bordering utility corridors and public rights of way via Safety Fair, Website, or Quarterly Newsletter.

Coordinate with arboricultural groups, public agencies, and utilities to promote proper tree pruning and care practices that can reduce the risk of tree failure and property damage. Common messages refined by state level entities such as the Oregon Department of Forestry (ODF) and OSU Extension can help provide continuity and efficiency across the state.

Coordinating Organization:	Silverton Community Development

Internal Partners:	**External Partners:**
Silverton Code Enforcement, Public Works	PGE, Phone and Cable Utilities, OSU Extension

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Wind Storm #2

Proposed Action Item:	**Alignment with Plan Goals:**
Continue to support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	*Goal 2: Education* *Goal 3: Preventative* *Goal 5: Partnerships and Coordination.*

Rationale for Proposed Action Item:

Tree falls during wind or winter storm events can be a risk to overhead power lines. During a wind or winter storm, tree falls have the potential to down overhead power lines, causing electric power failures. Silverton's development code requires that all new subdivisions have underground utilities, however, undergrounding utilities outside of subdivisions and in older subdivisions can reduce the effect of ice loading and tree falls to reduce a community's risk to wind or winter storms, and limit disruptions in service.

Silverton has experienced severe wind storm events in the past and is vulnerable to windstorm events. The wind storm risk assessment notes that Silverton's probability of a windstorm recurring is high and the city's vulnerability to windstorm events is also high. Undergrounding utilities to reduce the effect of ice loading and tree falls can help mitigate a community's risk to wind or winter storms, and limit disruptions in service.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on both new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Continuing to support/encourage electrical utilities to use underground construction methods where possible can reduce future power outages from windstorms.

Ideas for Implementation:

Support/encourage electrical utilities to use underground construction methods outside of new subdivisions and in older subdivisions, or where possible to reduce power outages from windstorms.

Consider providing incentives to utilities or property owners to underground utilities.

Contact PGE and CenturyTel to participate in future mitigation plan update processes. Document concerns, where applicable, and seek funding to underground utilities.

Develop a hazardous tree inventory for all community properties.

Coordinating Organization:	Silverton Community Development

Internal Partners:	**External Partners:**
Silverton Public Works	Utility Providers

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Wind Storm #3*

Proposed Action Item:	**Alignment with Plan Goals:**
Regularly assess the health of trees in Coolidge McClaine Park to prevent damage to buildings and utilities from falling trees.	*Goal 3: Preventative* *Goal 5: Partnerships and Coordination.*

Rationale for Proposed Action Item:

The Silverton Steering Committee indicated that Coolidge McClaine Park has many trees that could damage park facilities – including play areas, a kitchen shelter, restroom, and two buildings that house the Art Center and Art Gallery. Regularly assessing the health of trees in the park will prevent damage to buildings and utilities from falling trees.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on both new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Regularly assessing tree health in the forested Coolidge McClaine Park could prevent future property damages caused by wind storms.

Ideas for Implementation:

Contact Marion County's certified Arborist to see if she would be willing to perform this service.

Develop a list of agencies, organizations, etc., who would be able to provide assistance in assessing tree health on their property.

Coordinating Organization:	Silverton Community Development

Internal Partners:		**External Partners:**
Silverton Public Works		Marion County Arborist
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
2 years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Winter Storm #1*

Proposed Action Item:	**Alignment with Plan Goals:**
Continue to educate citizens about ways to weatherize their homes, as well as safe emergency heating equipment	*Goal 1: Public Awareness* *Goal 2: Education*

Rationale for Proposed Action Item:

The Silverton risk assessment for severe winter storms notes that Silverton has a high probability and high vulnerability to winter storm events. The most recent major winter storms occurred in January/February 2008 and in December 2008/January 2009. During both winter storms, the governor declared a state of emergency in Marion County and in surrounding counties. Severe winter storms can bring extreme cold, snow, and ice, causing power outages and breaks in un-insulated water lines. Power outages can lead to heat loss, potentially harming citizens. Educating citizens about ways to weatherize their homes, as well as safe emergency heating equipment, can reduce the effects of extreme cold and inform residents of how to properly heat their homes in the event of a power outage.

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Educating citizens about ways to weatherize their homes, as well as safe emergency heating equipment will improve the safety of community members but also protect existing buildings from damage due to severe winter storms.

Silverton has vulnerable youth and elderly populations, many of whom are especially vulnerable to power outages and lack backup sources of heat and water. Educating these citizens about ways to weatherize their homes and safe emergency heating equipment they can use will reduce the vulnerability of these populations.

Ideas for Implementation:

- Use energy audits, cash rebates, and tax credits to help homeowners weatherize their homes.
- Coordinate efforts with home improvement businesses to educate citizens about weatherizing homes and providing safe emergency heating equipment.
- Coordinate education efforts with Northwest Natural gas to education citizens about weatherization.
- Coordinate with the Silverton Fire District to develop a list of emergency heating information.
- Advertize weatherization tax credits to serve as an incentive for people to weatherize their homes and reduce their heating bills.

Coordinating Organization:	Silverton Administration

Internal Partners:	**External Partners:**
Silverton Community Development	Silverton Fire District, PGE, Northwest Natural, Community Action Agency

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
2 years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Multi-Hazard #1

Proposed Action Item:	**Alignment with Plan Goals:**
Seek funding for the construction of a new City Hall facility that is outside the flood inundation zone and that is earthquake resistant.	*Goal 3: Preventative* *Goal 7: Emergency Services*

Rationale for Proposed Action Item:

The existing City Hall facility was constructed in 1925 and is located in a flood inundation zone. Furthermore, the facility is highly vulnerable to earthquakes and will not withstand a severe earthquake should it occur. Silverton's risk assessment notes that the city has a high probability of floods recurring and moderate vulnerability to floods. In addition, Silverton has a high probability and high vulnerability to earthquake events. In the event of a catastrophic flood or earthquake, city government operations would likely cease to exist. City employees inside the facility at the time of the event would more than likely be injured or not survive.

City owned-buildings and facilities should be resilient to natural hazards to ensure continuous service during and after disasters. After Hurricane Katrina, the Harrison County, Alabama Recovery Plan noted the following: "It is important that critical facilities function during and after disasters. Local units of government want to insure continuous service by strengthening essential facilities such as fire stations, city halls, shelters, and police stations."[6] Seeking funding for the construction of a new City Hall will reduce the city's overall vulnerability to flood and earthquake hazards.

The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Seeking funding for construction of a new City Hall that is outside the flood inundation zone and that is earthquake resistant will reduce the city's overall vulnerability.

Ideas for Implementation:

Explore the possibility of a tax measure that would allow for the construction of a new City Hall facility that is (1) outside the flood inundation zone and, (2) that is earthquake resistant.

Coordinate implementation of this action with the development of the Facilities Master Plan (see Multi-Hazard Action # 2)

Coordinating Organization:	City of Silverton

Internal Partners:	**External Partners:**
City Council, Public Works	Marion County, OEM, DOGAMI

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

[6] Source: Harrison County Community Recovery Plan. August 2006. FEMA ESF-14 in support of the state of Mississippi. p. 61.

Action Item Status: New Action (2009)

Multi-Hazard #2

Proposed Action Item:	**Alignment with Plan Goals:**
Create a Facilities Master Plan that assesses the need for new or updated facilities, and incorporates natural hazard vulnerabilities and mitigation measures for reducing vulnerability.	*Goal 3: Preventative* *Goal 7: Emergency Services*

Rationale for Proposed Action Item:

Facility master plans assess current city facilities and city-wide facility needs and provide recommendations for further improvements. Currently the city of Silverton does not have a Facilities Master Plan that provides an overall assessment of city-owned facilities. Creating a plan that assesses the need for new or updated facilities, and incorporates natural hazard vulnerabilities and mitigation measures for reducing vulnerability, will improve city services and reduce the city's overall vulnerability to natural hazard events. In addition, buildings and facilities in hazard areas may be eligible for Pre-Disaster Mitigation funding.

The Disaster Mitigation Act of 2000 requires communities to assess their vulnerability to natural hazards, particularly by identifying the types and number of buildings, infrastructure, and critical facilities that could be affected [201.6(c)(2)(ii)(A)]. This Facilities Master Plan would record the number of city-owned buildings and infrastructure that could be affected as a result of a natural hazard.

Ideas for Implementation:

Coordinate development of the Facilities Master Plan with information found in the Silverton Addendum to the Marion County Natural Hazards Mitigation Plan.

In the facilities plan, identify the number of buildings and facilities in specific hazard areas, the potential dollar losses to the facilities, and the methodology used to develop the estimates. This will meet the requirements of the Disaster Mitigation Act of 2000.

Seek funding for retrofitting buildings and infrastructure in hazard areas to reduce vulnerability

Coordinating Organization:	City of Silverton

Internal Partners:	**External Partners:**
City Council	FEMA, OEM, Marion County

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Multi-Hazard #3

Proposed Action Item:	**Alignment with Plan Goals:**
Establish mutual aid agreements between government agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc)	*Goal 5: Partnerships and Coordination*

Rationale for Proposed Action Item:

Mutual aid agreements and assistance agreements are agreements between agencies, organizations, and jurisdictions that provide a mechanism to quickly obtain emergency assistance in the form of personnel, equipment, materials, and other associated services. The primary objective is to facilitate rapid, short-term deployment of emergency support prior to, during, and after an incident. (Source: FEMA NIMS Resource Center)

Developing formal agreements with internal and external partners could assist the partners in collaborating and sharing the responsibility of natural hazard mitigation. Such actions to form collaborative partnerships and commitments to mitigation can assist the city in reducing its risk to the natural hazards addressed by the NHMP.

Ideas for Implementation:

Identify and pursue MOUs with potential external partners such as non-profit organizations or state and federal agencies that may be able to assist in implementing pre-disaster mitigation activities.

Renew MOUs for each calendar year so that they can be updated to reflect the changing needs and conditions of the community and internal and external partners; have both internal and external partners resign the updated MOUs each calendar year.

Develop a continuity of operations plan for city functions. Identify opportunities for mutual-aid where needed.

Coordinating Organization:	Silverton Administration

Internal Partners:	**External Partners:**
Silverton Public Works, Silverton Police Department	Marion County, City of Mt. Angel, ODOT, Marion County Emergency Management, Silverton businesses

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Multi-Hazard #4

Proposed Action Item:	**Alignment with Plan Goals:**
Educate businesses and governmental organizations about the importance of continuity of operations plans to make them more resilient to natural hazards	*Goal 1: Public Awareness* *Goal 2: Education* *Goal 3: Preventative*

Rationale for Proposed Action Item:

Silverton is vulnerable to a number of natural hazards that could affect the administration and management of local government and of local businesses. According to Silverton's risk assessment, the city has a high probability and vulnerability rating to wind storms and winter storms; a high probability and moderate vulnerability to flood; and a high probability to the earthquake hazard. Any of these natural hazard events could disrupt business and government activity. Educating businesses and governmental organizations about the importance of continuity of operations plans will encourage their development and assist in making local governments and businesses more disaster resilient.

Research conducted by Richard Wilson has shown that staff turnover is likely to occur after a disaster. Veteran staff is critical after a disaster. It is important to prevent turnover so that existing personnel do not have to take on extra responsibilities during an already stressful time. Continuity planning can also help lessen turnover by ensuring competitive salaries and benefits and by reducing the amount of stress staff will have to endure.

The Disaster Mitigation Act of 2000 requires communities to develop actions that reduce the impact of a natural hazard [201.6(c)(3)(ii)]. Educating businesses and governmental organizations about the importance of continuity of operations plans can encourage the development of plans and make businesses and governmental organizations more resilient to natural hazards.

The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation would be a way to keep the public involved in Silverton's efforts to mitigate hazards.

Ideas for Implementation:

- Host an Open for Business training workshop, developed by the Institute for Business and Home Safety (IBHS), in partnership with the Silverton Chamber of Commerce, to educate businesses on the importance of continuity of operations plans and how to develop a plan for their business.
- For governmental organizations, research and review completed continuity of operations plans to provide a foundation of expected content and issues to review. The COOP should ensure shelter housing for critical staff and family members such as city officials, public works employees, emergency response, and others.
- Assess and prioritize critical positions and resources vital to the continuance of important County functions.
- Incorporate COOP into the existing Emergency Operations Plans where applicable.
- Work with Marion County to establish a local government business continuity plan utilizing a grant.

Coordinating Organization:	Silverton Administration

Internal Partners:	**External Partners:**
City EOC staff, All City Departments	Chamber of Commerce, Marion County Emergency Management

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Multi Hazard #5

Proposed Action Item:	**Alignment with Plan Goals:**
Coordinate efforts with the Red Cross to review and assess potential safety zones/shelter sites.	*Goal 5: Partnerships and Coordination* *Goal 7: Emergency Services*

Rationale for Proposed Action Item:

In the event of a natural hazard emergency, residents as well as vulnerable populations, such as the very young, the elderly, and tourists, may need to seek shelter. Public schools often serve as initial shelter sites, but some of these shelters may not be seismically stable, are in poor condition, or are located in the floodplain. While the Red Cross is responsible for designating emergency shelters in Silverton,[7] these shelters should be reviewed and assessed for their level of safety and preparedness. Furthermore, Memorandums of Understanding (MOUs) regarding these facilities should be reviewed to ensure they are adequate for the city's needs.

Ideas for Implementation:

- Convene a meeting with the Red Cross, City Emergency Responders, and with owners of the shelters to discuss the use of their buildings as shelter sites.
- Assist the American Red Cross in determining the suitability of proposed shelters and safety zones.
- Review existing MOUs and obtain other needed MOU's with partnering groups.
- Determine what resources such as generators, cots, trained volunteers, and non-perishable supplies are available at each site to ensure and enhance response capabilities.
- Apply for grants to purchase any necessary equipment.
- Assist the American Red Cross in recruiting site volunteers for training in Introduction to Disaster Services, Shelter Operations and Mass Care.

Coordinating Organization:	Silverton Emergency Management

Internal Partners:	**External Partners:**
Police Department, Fire District	Silver Falls School District, local churches and organizations.

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	$30,000
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

[7] *Silverton Emergency Response Plan*, Functional Annex 2: Human Resources, 7.2.

Multi-Hazard #6

Proposed Action Item:	**Alignment with Plan Goals:**
Encourage the development of VOAD (Voluntary Organizations Assisting in a Disaster) to ease the load on emergency services following a disaster.	*Goal 5: Partnerships and Coordination* *Goal 7: Emergency Services*

Rationale for Proposed Action Item:

Voluntary Organizations Assisting in a Disaster (VOAD) consist of nonprofit organizations whose mission includes programs either in disaster preparedness, response and/or recovery. The Oregon Voluntary Organizations Active in Disaster (ORVOAD) consists of voluntary and state government organizations with disaster relief roles. VOAD functions include animal control, building repair, child care, clean up, clothing, communication, counseling, damage assessment, disaster welfare inquiry, financial assistance, food, human relations, mass care, sheltering, transportation, volunteer staffing, and warehousing and bulk distribution. Silverton is home to a diverse population. While disaster notification systems are in place for the English speaking population, there are growing Hispanic and Russian Old Believer populations that would require information to be provided in Spanish and Russian. The medically fragile residents will require additional education and resources to ensure safe transportation and sheltering should evacuation be necessary. Encouraging the development of a local VOAD would organize Silverton's many non-profits and churches to offer coordinated services and volunteer assistance to these vulnerable populations in a response and recovery phase.

Development of a local VOAD, and coordinating these efforts with other mitigation, preparedness, and response efforts can lead to a more holistic emergency management approach that will make Silverton more resilient to natural hazards.

Ideas for Implementation:

- Develop an education committee comprised of partnering agencies to provide community presentations on VOADs and what they do. Contact all local churches, organizations, schools, parent groups, and businesses to schedule presentations. Information on ORVOAD can be found at www.orvoad.org
- Conduct special events such as National Night Out in August and a Safety Fair during National Emergency Preparedness Month.
- Create a formal VOAD and invite all interested organizations. VOAD meetings will be conducted on a regular basis and ICS training will be provided to ensure an overall understanding of roles and activation procedures during a disaster. Work with local home health agencies to provide assistance to the medically fragile in developing personal emergency plans.

Coordinating Organization:	Silverton Community Development
Internal Partners:	**External Partners:**
City of Silverton, Silverton Police Department	Silver Falls Fire District, Silverton Hospital, American Red Cross, Marion County Health Department, Russian Old Believers Enhancement Services, Silver Falls School District, Silverton Together, Somos Hispanas Unidas, local churches, organizations and non-profits, ORVOAD

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	$25,000 over 5 years.
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Multi-Hazard #7

Proposed Action Item:	**Alignment with Plan Goals:**
Purchase and place automatic external defibrillators (AED's).	*Goal 7: Emergency Services*

Rationale for Proposed Action Item:

According to the American Heart Association, the number one factor contributing to the survival of a patient who has a cardiac emergency is the use of an AED in combination with rescue CPR. It is vital that an AED be applied to the patient within the first six minutes of the event. For this reason, it is recommended that the AED be placed so that it may be utilized in a rapid manner for City of Silverton personnel and citizens.

Ideas for Implementation:

- Collaborate with internal and external partners for assistance in placement, purchase, and current need.
- If AEDs are place in public places, the American Heart Association recommends that communities be part of a defibrillation program in which persons that acquire an AED notify the local EMS office; a licensed physician or medical authority provides medical oversight to ensure quality control; and persons responsible for using the AED are trained in CPR and how to use an AED. (Source: http://www.americanheart.org/presenter.jhtml?identifier=3011859)
- Focus on areas within the City of Silverton governmental structure and community that may be identified as a priority (structures, community centers, etc).
- Seek grant funding to allow for complete cost recovery or to augment budgeted items.
- More information on AEDs can be found at the American Heart Association's websites at www.americanheart.org

Coordinating Organization:	City of Silverton

Internal Partners:	**External Partners:**
Silverton Police, Public Works, Silverton Fire District	Silverton Together, Silverton Ambulance, Other civic groups.
Timeline:	**If available, estimated cost:**
Short Term (0-2 years) / Long Term (2-4 or more years)	$1500 - $2000 per unit
Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Multi-Hazard #8

Proposed Action Item:	**Alignment with Plan Goals:**
Improve coordination and evaluation of technical and engineering gaps in communications capabilities for natural hazards event response.	*Goal 3: Preventative* *Goal 5: Partnerships and Coordination* *Goal 7: Emergency Services.*

Rationale for Proposed Action Item:

The Silverton Steering Committee identified the need to improve coordination and evaluation of technical and engineering gaps in communications capabilities. Communications is essential to provide a coordinated emergency response, and technical gaps can include incompatibility of radio systems and lack of backup power and emergency operations plans. Improving coordination and evaluation of technical and engineering gaps in communications capabilities will improve the response to natural hazards and other emergency events.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on communities [201.6(c)(3)(ii)]. Improving coordination and evaluation of technical and engineering gaps in communications capabilities for natural hazards event response will help in a response effort and reduce the impact of an occurring disaster.

Ideas for Implementation:

- Where possible, develop mutual aid agreements for assistance after a catastrophic natural hazard event.
- Identify likely scenarios for rebuilding communications equipment and systems after a catastrophic event.
- Improve survivability of emergency communications systems between critical facilities and emergency responders by providing backup emergency power systems and developing plans that address interoperability issues.

Coordinating Organization:	City of Silverton Emergency Management

Internal Partners:	**External Partners:**
Fire department, law enforcement, City, etc.	Marion County; Oregon emergency Management; Red Cross; Army National Guard; Grants

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Multi-Hazard #9

Proposed Action Item:	**Alignment with Plan Goals:**
Encourage citizens to prepare and maintain 72 hour kits.	*Goal 1: Public Awareness* *Goal 2: Education* *Goal 3: Preventative*

Rationale for Proposed Action Item:

Silverton is vulnerable to a number of natural hazards that could disrupt services. According to Silverton's risk assessment, the city has a high probability and vulnerability rating to wind storms and winter storms; a high probability and moderate vulnerability to flood; and a high probability to the earthquake hazard. In a major disaster, utilities transportation networks, and businesses could be disrupted, and it may take days until vital services are restored. Preparing a 72 hour kit can help community members survive on their own without relying too heavily on emergency services.

The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation and preparedness would be a way to keep the public informed of, and involved in, the city's actions to mitigate and prepare for hazards.

Ideas for Implementation:

Provide educational material and examples of how to assemble 72 hour kits to residents of the city and employees. Outreach and awareness campaigns need to be carefully organized and developed to ensure that residents receive critical information. Distribute information through the city's newsletter, which is sent out every 2 months with water bills. Alternatively, post information about 72 hour kits on the city's website.

During National Emergency Preparedness Month or National Night Out, use first responders and community members to host educational presentations to groups within the community to encourage individuals to put together their own kit.

Resources like www.preparedness.gov or www.72hours.org can provide content needs for 72 hour kits.

Coordinating Organization:	City of Silverton

Internal Partners:	**External Partners:**
Emergency Operations Center Staff	Community Steering Committee members, Silverton Rural Fire District; Silverton Hospital, Marion County Emergency Management, Marion County CERT

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
2 Years		

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)

Multi-Hazard #10

Proposed Action Item:	**Alignment with Plan Goals:**
Review, and if necessary revise, emergency management and business continuity plans, policies, and ordinances to ensure effective response, business continuity, and post-disaster recovery efforts.	*Goals 7: Emergency Services*

Rationale for Proposed Action Item:

Silverton is vulnerable to a number of natural hazards that could disrupt services. According to Silverton's risk assessment, the city has a high probability and vulnerability rating to wind storms and winter storms; a high probability and moderate vulnerability to flood; and a high probability to the earthquake hazard. Should any of these hazard events occur, the city would need to respond and potentially recover while maintaining continuity of operations. To ensure that the city is capable of responding to emergencies from a policy standpoint (purchasing, contracting, emergency declaration, alternative Council meeting sites, potential phone meeting if facilities aren't available), continue basic business operations, and recover from a disaster, the city should regularly review, and if necessary revise, emergency management and business continuity plans, policies, and ordinances.

Ideas for Implementation:

- Review existing ordinances and emergency response plans to ensure response capabilities from a purchasing and contracting standpoint.
- Identify local providers and pre-arrange pricing for a variety of possible scenarios (materials, services, etc.).
- Conduct review of city purchasing and contracting policies and ordinances to ensure timely review of building permits, utility billing, and other regulatory requirements that require city review and approval post-disaster.
- Research how other cities handle business continuity issues post-disaster, including fee requirements, expedited review, etc.
- Conduct regular tabletop and real exercises to ensure that city departments understand their roles and responsibilities.
- Use the exercises to identify potential response and recovery needs and identify any mitigation action items that would reduce the need to respond.

Coordinating Organization:	City of Silverton-Emergency Management

Internal Partners:	**External Partners:**
Building Department, Planning Department, Police Department, Fire District	Marion County Emergency Management

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	n/a
	Long Term	

Form Submitted by:	Silverton Steering Committee

Action Item Status: New Action (2009)